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THE IRON AGE

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▲▲▲ THE IRON AGE ▲▲▲

FEBRUARY 8, 1940

ESTABLISHED 1855 Vol. 145, No. 6

Surrender? We've Just Begun to Fight!

AMERICAN business and the American System of Enterprise have received so many rights to the chin and lefts to the solar plexus during the past seven years of "nudeelism" that it would not be at all strange if they felt somewhat groggy.

Two telling blows, for example, were delivered to private enterprise and employment this past week. One of these was the "majority" decision of the Supreme Court of the United States enabling the money hungry politicians of any city to levy taxes, at their pleasure, upon citizens in connection with interstate as well as intrastate commerce. This decision, made over the vehement protest of Charles E. Hughes and his non-packed minority associates, opens the door to the greatest pork barrel yet discovered in America and to the ruthless rooking of millions of taxpayers.

The second blow was a decision of the Appellate Division of the Supreme Court of New York State, which gave to union labor the right to strike against the introduction of improved machinery, whenever in its estimation such machinery by reason of "labor saving" qualities might reduce employment. Nothing, of course, was said about the employment that such devices might create through eventual stimulation of the industry or in other circles than that of the immediate application.

Offsetting these two discouraging deterrents to the sadly needed flow of private investment funds was the action of the executive committee of the AFL last week. This great labor body, as part of its conclusions said:

"We urge that all Government actions that tend unnecessarily to discourage business expansion cease and that a positive effort be made to encourage industrial activity."

After seven years of fighting for its life in a ring where no Marquess of Queensberry rules applied and where administrative and legislative blackjacks were indiscriminately used by their antagonists, American business and industry are just beginning to fight. And with skilled labor now coming to their rescue, they will fight with a new assurance of victory.

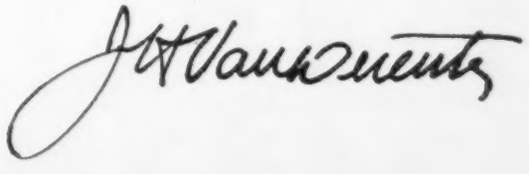
It is true that a small portion of industry and business has adopted the defeatest attitude as portrayed by the poet Whittier:

"For of all sad words of tongue or pen,
The saddest are these: 'It might have been!'"

But most of us, thank God, prefer the modern version:

Of all brave words of press or typewriter,
The bravest are: "I'm still a fighter!"

Surrender? We've just begun to fight!



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ZINC-ALLOY DIES *for* DROP HAMMER WORK

By W. W. BROUGHTON
Morris P. Kirk & Son, Inc., Los Angeles

IN the articles concerning the production of "Job-Lot Aircraft Stampings," which appeared in THE IRON AGE in the issues of Oct. 19 and 26, 1939, the statement was made that what has really made the drop hammer feasible for short run work in the aircraft industry has been the development of combination, low-cost, lead-zinc dies, made from a single wood or plaster pattern. The technique of drop hammer work was then briefly described, with particular emphasis on the trend toward the use of air powered drop stamps in place of the less efficient rope drop hammers still in use in many aircraft factories. Little information was given as to the metallurgical and foundry practice aspects of the die materials, however, except to point out that the lower melting point of lead made it possible to cast the lead punch directly into the female zinc die, eliminating the need of a second mold and thereby cutting another cost corner.

Up until a year ago, about the only material used for such drop hammer dies was either special high grade zinc (99.99 per cent pure zinc) or Prime Western zinc. The chief drawback of straight zinc is that, because of its low ultimate strength and elastic limit, it cannot withstand, without deformation, the blows of a drop hammer. The twentieth stamping from a zinc die is always appreciably larger than the first. The drop hammer technique as applied to aircraft stampings was pioneered on the West Coast, and it was only natural that the industry there should turn to its principal supplier of lead and zinc to solve this problem of short die life. The company, Morris P. Kirk & Son, Inc., Los Angeles, is also a large producer of zinc-base alloys for die castings and hence was familiar with the tremendous improvement in physical properties obtainable by alloying zinc with aluminum, copper and magnesium.

The very first tests made by this firm indicated that the standard die casting alloys, although developed for an entirely different purpose, were greatly superior to straight zinc for stamping dies. Many such dies were produced in the alloy known as Kirksite 2, made under license from the New Jersey Zinc Co. and corresponding to its alloy, Zamak 2, covered by SAE specifications No. 921, and ASTM alloy XXI. This zinc alloy contains 3.5 to 4.5 per cent aluminum, 2.5 to 3.5 per cent copper and 0.02 to 0.10 per cent magnesium. The alloying elements have the effect of refining the grain and this tendency is greatly enhanced by the chilling effect in die casting under pressure. Although the physical properties of a sand casting, such as aircraft drop hammer dies, are obviously lower than those of die castings, nevertheless they are markedly superior to straight zinc, as can be seen in the accompanying table.

Engineers of the Kirk company were of the opinion, however, that by slight modifications in the alloy composition, additional strength and hardness could be secured. Because of the basic difference between die casting and sand casting technique, these modifications were possible and the desired physical properties achieved. Limits were established and a new alloy produced which the manufacturer claims gives both a higher tensile strength and increased hardness. This alloy is said to cast equally well in sand and produces clean, bright, smooth surfaces which need no finishing beyond a light buffing with a portable power driven disk. This material is known as Kirksite A, and dies made from it are now producing from 10 to 50 times as many stampings as did their predecessors made from straight zinc.

When wear becomes noticeable, the Kirksite or Zamak dies can be reclaimed by welding, an operation impossible on a straight zinc die. Because of the absence of any plastic range in the zinc-base alloys, however,

PROCESS of leveling the bottom of a large size zinc-base alloy drop hammer die while it is still in the sand mold. A reducing flame is used with a large size tip.

the technique of building up worn edges is somewhat difficult to one not familiar with this work. It is usually necessary to rotate the die while building up the edges, so that the portion being welded is nearly horizontal. A reducing flame should be used. Any flux that is satisfactory for welding cast aluminum will give good results, but should be used sparingly.

Leveling of the bottom of the dies may be done in any one of three ways. The most expensive way, and the one least used, is to plane or mill the base. Another method is to play an oxy-acetylene or oxy-hydrogen torch on the top of the casting while it is still in the sand, since the female die is always poured upside down. A large tip is used and the flame is maintained slightly reducing. By working around the edge of the casting, the shrinkage depressions are kept supplied with molten alloy and the high portions are worked down to the average level. A faster method is to wait until the casting has just frozen and then pour a cap of molten alloy into the shrinkage depression.

Elimination of Warpage

While in general, sand castings of the zinc-base alloys are freer from warpage than those of straight zinc, the alloys are so tough and strong that once a die is warped, the heaviest blow of the hammer will not straighten it. In order to reduce warpage to minimum, therefore, engineers of the Kirk company recommend pouring the die in three stages, the first covering the entire surface of the mold to a depth of 1 in. The second pour, to an additional depth of 1 or 2 in., is then made when all except a molten spot in the center of the heaviest part of the first pouring has solidified. When solidification of the second pour is about to be completed, the balance of the casting is poured.

Another method of reducing warpage is to cover the newly poured castings while still in the sand with a sheet of asbestos board, or a sheet of iron over which a layer of sand is shoveled, the purpose being to retard radiation losses and the freezing of the top of the casting until a strong crust of solid metal is formed in contact with the sand. The drier the sand used, the more need there is for a cover.

Molding Practice

In making sand molds, straight Albany sand with no more moisture than necessary has been found very satisfactory for casting zinc alloy dies. Patterns may be either plaster or wood. Plaster patterns for large dies are made hollow for lightness, and flax or other fibrous material is added to increase the strength. Wood patterns should be well shellacked to avoid warpage due to moisture in the sand.

For many stamping dies, a plaster pattern corresponding in size and shape to the completed die, is made from a wood master pattern. Considerable advantage can be taken of the greater strength of the alloys to reduce the thickness of metal under the deepest portion of the die (by at least one-third that required for straight zinc) and also to reduce the corresponding length and breadth of the die. Where a wide bearing area is required around the cavity in order to produce smooth stampings, with the high strength alloys such a surface can be obtained without excessive weight and bulk by forming a ledge around the top of the die. In molding, the cavity for this ledge is formed by loose pieces that are withdrawn horizontally into the main mold cavity after the pattern proper is withdrawn.

Since these low cost dies are seldom given more than a polishing operation for finish, although they are readily machinable, it is necessary to exercise care in molding, particularly in seeing that the walls of the mold are not compressed or otherwise distorted when the pattern is withdrawn from

the sand. As much draft as possible should be used on the pattern to facilitate its removal. Screw type lifts suspended from cross bars and applied at four corners of the pattern are a great help in easing it out of the mold in an absolutely vertical direction.

Gating

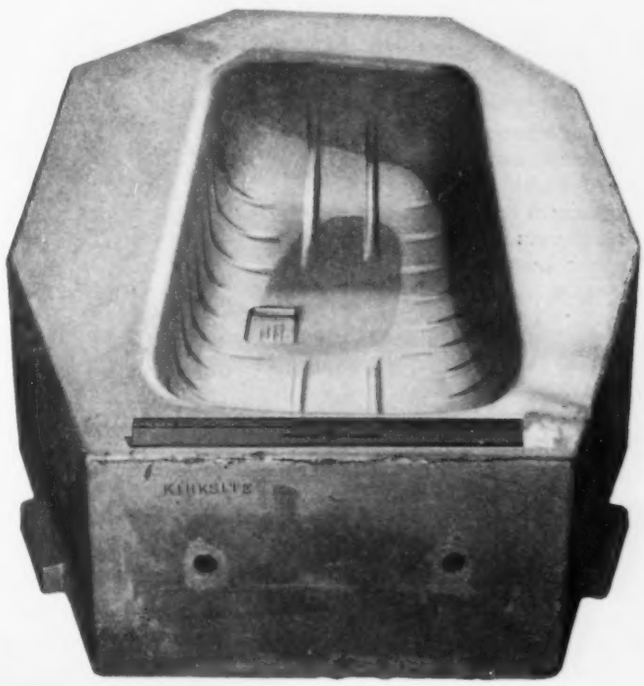
A variety of forms of gates are used, but a horn type appears best. It should be somewhat heavier than is customary with zinc. About 1¼ in. diameter seems the most satisfactory size. One gate is better than two, except where there are two heavy, deep sections separated by a light, shallow section, in which case a gate to each heavy section should be made. Pouring should be done from one ladle at a time and very slowly until the whole bottom of the mold is covered. After this, faster pouring can be done through the gate, and when the mold is fairly well filled up, the balance of the metal can be poured directly into the cavity. No risers are needed since the dies are poured with base up, open to the air.

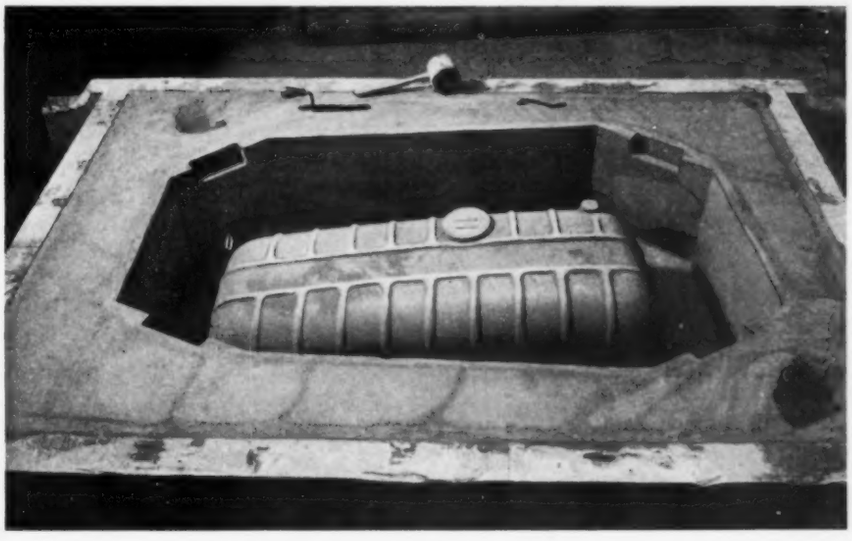
Melting Practice

In melting these zinc-base alloys, two dangers must be avoided—contamination from low melting point metals like lead, tin and cadmium, also from iron; and overheating. For die castings, SAE and ASTM specifications are very rigidly drawn as to limits of impurities in order to keep to a minimum the loss of strength and changes in dimension that occur as the casting ages. Fortunately, the requirements of an alloy for drop hammer dies are not so severe as those for die castings, because the dies have a much shorter useful life, and aging phenomena are not so important. Dimensional tolerances are larger on stampings than on die castings, and the tendency to crack in the mold is not so great in a sand mold as in a steel die.

For hammer dies, the chief contaminating metals are lead and iron. Melting of the lead male dies should be done in a separate room, if possible. Care should also be taken in remelting zinc-base dies to see that none of the lead used to anchor the die on the platen of the hammer adheres to the zinc die. Limited experience indicates that more than 0.500 per cent lead cannot be tolerated in the alloy for drop hammer dies (as against 0.007 per cent max. for die castings). With 0.500 per cent lead in the alloy, the aging effect at the end of two years will reduce the tensile strength by about 40 per cent and the impact value by more than 75 per cent. It should be noted, however, that these strengths are still comparable with straight zinc. Remelting and recasting will temporarily restore the original physical properties.

Iron is a harmful impurity which will adversely affect the surface smoothness of the die as well as increase shrinkage draws at corners and cause brittleness. The presence of more than 0.25 per cent iron will manifest itself by peculiar marks on both inside and outside vertical walls of the die that resemble the delta of a river and that are known in the parlance of West Coast aircraft factories





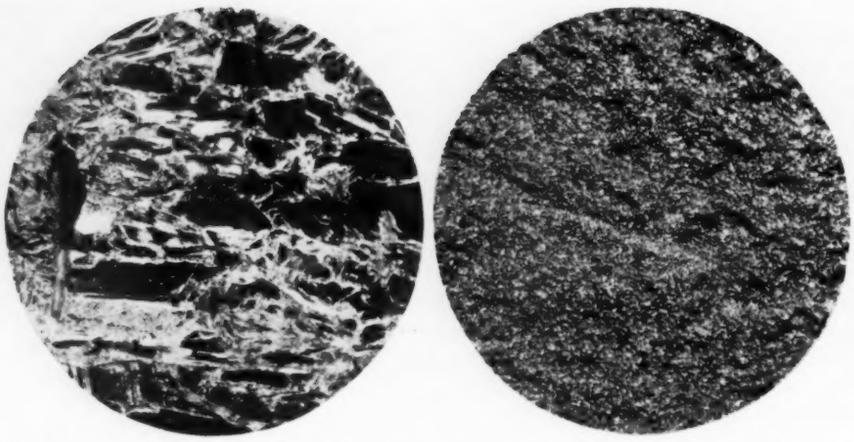
ABOVE

DIE produced from the mold shown below. This zinc-base alloy die weighed over 2 tons. No finishing was required other than polishing the cavity.

o o o

AT LEFT

SAND mold of large gasoline tank stamping die, ready for pouring.



PHOTOMICROGRAPHS of two diameters showing the grain structure of Prime Western zinc (left) and of Kirksite A (right). The introduction of alloying elements reduces the grain size markedly and results in greater strength and toughness.

as Dural Bug marks. Keeping the temperature below 900 deg. F. is the one cure for iron contamination.

Overheating increases the amount of iron pick-up from the pot, although much of this iron combines with the aluminum and is removed as a dross from the surface of the molten metal. Higher pouring temperatures also cause excess shrinkage in the casting. Low temperatures cause a sludge, rich in copper and low in aluminum, to form on the bottom of the pot. The temperature range of the pot should be carefully maintained between 775 and 825 deg. F. The use of a throttling type indicating or recording controller is a worth while investment in maintaining this range.

Pot Corrosion

Just as the alloy picks up iron from the pot, so also the pot may be affected by the soluble action of the molten alloy. Oddly, pots made of steel plate are very satisfactory with straight zinc but are rapidly corroded by zinc aluminum alloys. Cast iron pots are much more resistant to the solvent action of Kirksite A or Zamak 2. An iron of the following approximate composition has proved quite satisfactory, one such pot having given more than five months of continuous service:

Element	*Per Cent*
Carbon	3.4
Silicon	1.6
Manganese	0.6
Nickel	2.2
Chromium	1.1

Pot castings of this analysis should be normalized for 10 hr. at 750 deg. F. Foundry scale should not be removed. A coating of rust, in fact, is the best preventive against attack from the molten zinc alloy. Rust can be hastened by storing the pot outdoors and spraying with water occasionally. When the pot is first put into service, a wash of fireclay and water to which a small amount of sodium silicate has been added, applied after the pot is warmed to about 200 deg. F., will appreciably increase its life.

Kirksite A metal and the Zamak alloys are obviously more expensive materials than Prime Western zinc, but dies made from these higher strength alloys are approximately the same in cost if advantage is taken of the possibility of greatly reduced sections as a result of higher physicals. On the basis of die cost per stamping produced, the advantage goes to the alloys, because of the much greater die life obtainable. There are other advantages also that tend to lower production costs. Zinc alloy dies as they come from the sand are cleaner and smoother than straight zinc dies and therefore require less finishing. The castings are sounder and never have to be repoured because of the presence of blow holes. The lower melting point of the alloy results in measurable fuel saving and lower dross loss. Both labor and drop hammer time is saved by reason of the longer life of the alloy dies and their freedom from breakage. Greater speed is obtainable when the operator knows that the die will stand the punishment of a full blow of the hammer. It is also possible to use harder lead punches (obtained by increasing the antimony content up to about 10 per cent), thus resulting in fewer punch recasting jobs. The net result is better uniformity in the stampings produced.

Some users are making both punch and die of the alloy although a punch pattern is necessary if the die is much over a foot long. The lack of plasticity in the alloy makes it impossible to pound out the punch into the die to compensate for shrinkage. The use of a zinc-base alloy punch and die often makes a starting die unnecessary, the finished shape being obtained gradually if necessary by the use of shims of plywood, removed one or more at a time between hammer blows.

While the use of dies of this type is confined almost exclusively to the aircraft industry at present, there is no apparent reason why this drop hammer technique cannot be applied to other stamping work in small quantities. As many as 2300 14-gage stainless steel exhaust manifold stampings have been produced from a Kirksite die. As indicated in the earlier articles, the savings in die costs are tremendous over conventional methods, and the use of the alloys mentioned above by extending the die life widens the range of application to stamping runs of a fairly substantial nature.

Besides being obtainable through Morris P. Kirk & Son, Inc., Los Angeles, Kirksite A is also available through the various branch plants of the National Lead Co., New York, the parent company. The Zamak alloys are sold through the New Jersey Zinc Sales Co., Inc., New York.

Comparative Physical Values of Sand Castings

Property	Pure Zinc	Zinc-Base Alloys	Cast Iron[1]
Tensile strength, lb. per sq. in.	5300	35,000-38,000	40,000 to 50,000
Impact strength, ft. = lb.[2]	Under 1	2-4	
Compressive strength, lb. per sq. in.		60,000-75,000	200,000[3]
Melting point, deg. F.	787	717	
Solidification shrinkage, in. per ft.	0.125	0.140	
Weight per cu. in., lb.	0.27	0.24 to 0.25	
Brinell hardness	30-60	80-107	200-240

[1] Typical auto body and fender die iron containing 1.50 to 2.00 per cent nickel and 0.50 to 0.60 per cent chromium. (Cast Metals Handbook-1940.)
[2] Charpy impact strength of ¼ in. square test bars with 40 mm. span.
[3] Rough estimate.

POINTERS ON GEAR CUTTING

By U. SETH EBERHARDT

Vice-President, Newark Gear Cutting Machine Co., Newark, N. J.

° ° °

A NEW gear cutting machine should be thoroughly oiled and run for at least half a day to be sure that the oil is circulating through the bearings. The machines should be lubricated every morning and the main drive parts at noon also. This takes only a few minutes and will increase the life of the machine considerably. Care should be exercised to keep the oil clean and the oil holes free from chips and dirt; this applies also where a central lubricating system is used.

The ways of the machine should not be used as an anvil or a convenient shelf for wrenches as this tends to bruise the finished surface. Also, anything left on the ways sometimes will become jammed between the moving part and the rest of the machine, with disastrous results.

When an order has been received and preparations are being made to cut the gears, it must be remembered that the accuracy of the gear cannot be any better than that of the blank. This is a problem when only the teeth are being cut.

Sometimes it is necessary to true the sides of the blank or turn the blank if it is a worm or a solid pinion, as the blank must be held true and rigid to get a good gear. The author believes it is economical to spend a little more time in turning the blanks to insure that the hole, outside diameter, and sides run true with each other. This extra time, if any, is usually more than saved when setting the blank in the gear cutter. This has been proved in many instances.

In one case where large quantities of small gears were being cut, the customer was shown that the time being taken to set the blanks running true in the gear cutter was longer than the turning time. In this shop the lathe department was working on piece-work and the gear-cutter operators on straight time. This point of good blanks can hardly be overemphasized. A little education and care in the turning department will save considerable time in setting up the blank in the gear cutter.

The gear cutting machine should be on a good solid floor or foundation. It is not necessary to bolt the machine down, but it should bear on as much of the floor as possible. Either thin wooden wedges or shims can be installed around the base, or the machine can be grouted in with sulphur, lead or cement after it is leveled. Regardless of the stiffness of the machine base, it should be leveled and then well supported. The author's company usually checks the level of the base at each end to be sure there is no twist in the bed, then lengthwise in three places to be sure it has no high or low spot in the middle.

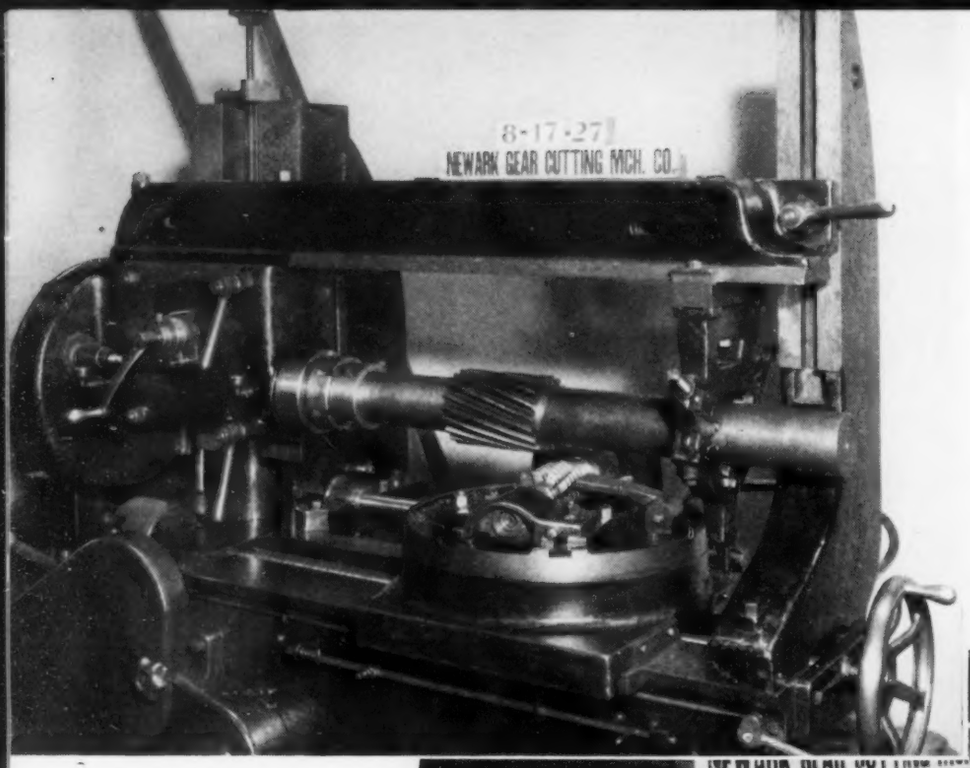
PREPARATION of machine and cutters, economy of accurately turned blanks, number of cuts, and procedure in cutting large, hard cast iron gears are covered in this article. The article is from a paper on "Experiences in the Gear Industry", presented at the 22nd semi-annual meeting of the American Gear Manufacturers Association, of which Mr. Eberhardt is vice-president.

Change gears should be adjusted with the minimum of backlash, but not tight, it being better to have a few thousandths play. The blank to be cut should be set true with the surface by which the gear will subsequently be held when installed in its final position. That is, on a gear which will be held on a shaft the hole should run true. This may be checked by revolving the gear on the work arbor and testing the O.D. with an indicator. The high spots are marked in thousandths, the amount the O.D. runs out. Then, when the gear is tightened on the arbor the whole assembly is revolved and the O.D. must run out the same amount in the same spot as it did when loose. The side run-out of the gear should be tested in the same manner.

Hob Grinding, Mounting

The cutter, whether disk type or hob, should be properly sharpened and mounted true. The shape of the tooth space or the quality of the gear will be governed very much by the care used in setting the cutter. If a disk cutter runs out on the O.D. only a few teeth will be doing the cutting, and they will become dull very quickly. If the cutter runs out sidewise or wobbles it will not produce the proper shape, besides making a thin tooth. If a hob runs out a proper tooth shape will not be obtained, as it requires the full revolution of the hob to generate the shape. It is good practice to check the top of the teeth of the cutters with an indicator on a true lathe mandrel, as carelessness in grinding the cutters will give the same effect as if the hole in the cutter is running out.

In grinding hobs the original gash must be followed closely. If the cutting edge is radial or hooking, it is very important that this be followed closely whenever the cutter is sharpened. A complaint on some large herringbone gears which were cut on one machine was recently received. The gears certainly ran noisily. Investigation showed the right-hand hob was ground about one-eighth hooking and the left-hand hob about one-eighth dragging. Of course the mating gears



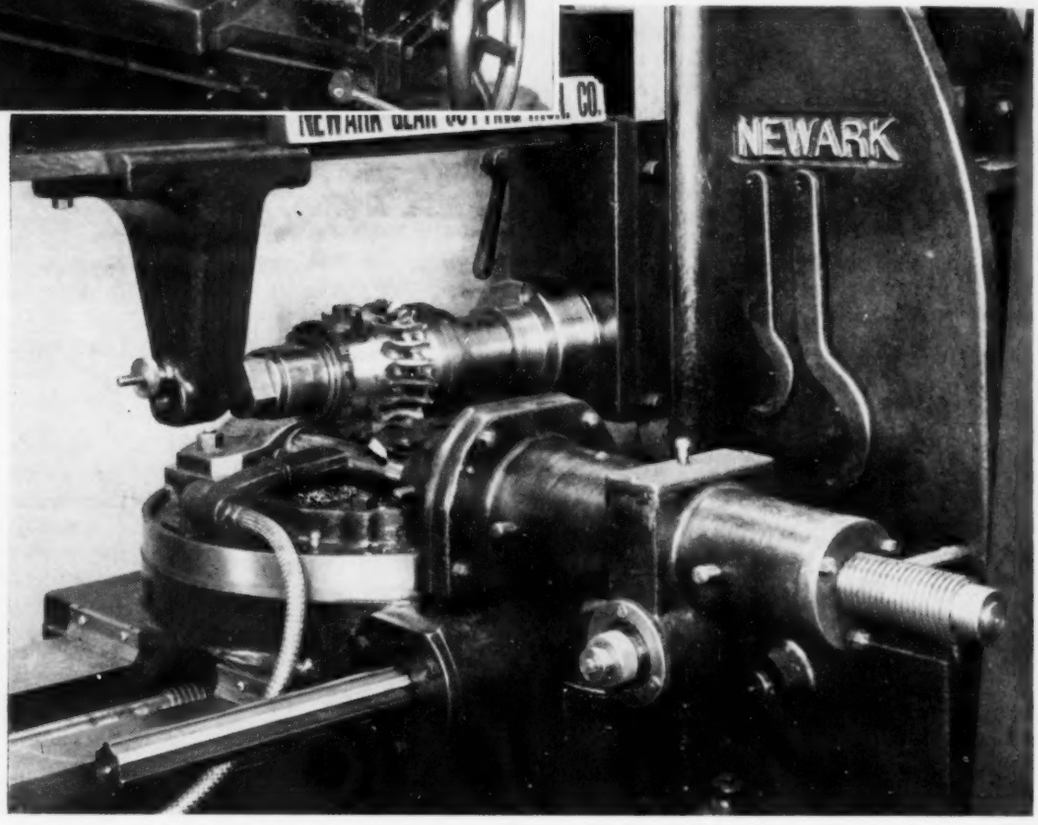
ABOVE

FIG. 1—The lathe-type steady-rest on this machine provides maximum support for the outer end of the pinion being cut.

o o o

AT RIGHT

FIG. 2—Newark gear cutting machine with tangential attachment fly tooling a bronze worm wheel. The fly tool is economically employed where quantities do not justify making of a hob.



had the effect of being cut at different pressure angles.

The number of cuts taken depends on the job. When it is necessary to take two cuts it is good practice to leave enough for the second cut, from 10 to 20 per cent of the depth being a good amount. If the amount left for the second cut is too little, there will not be enough metal to hold the blank being cut steady.

Cutting Cast Iron Gears

In cutting large cast iron gears a lot of heat is generated. On a disk cutting machine this will usually leave a thick tooth at the end. In hobbing, the gear will expand between the spokes, and this expansion will increase as the hob is fed across the blank so that when the gear cools a scalloped bevel gear results. The rate of speed and feed will govern this generation of heat and expansion. In some cases it is necessary to rough the gear and then let it cool before finishing.

A short time ago a customer brought in the problem as to what was causing his machine to hob cam-shaped gears. It was found that the steel castings had not been thoroughly annealed; the hardness specifications were quite high and the customer thought that money was being saved this way instead of annealing the blanks. As the teeth were cut the strains were relieved and the rim proceeded to bulge out between the spokes about 1/32 in. Most of these gears were scrapped. The advice given was to either properly heat treat the blanks or rough out about two-thirds of the depth and then in a day or two finish the cut. This latter method was found completely successful.

Quite a number of large, hard, cast iron spur gears are cut which have to be extremely accurate as regards tooth spacing. This is done on a No. 7 Newark Gear Cutting machine. The practice is to rough cut enough teeth so that just a little warmth can be felt, this usually being about one-twelfth the circumference. Then, skip about the same amount and rough again. This prevents the heat from increasing enough to cause excessive expansion. Next, a semi-finishing cut is taken about nine-tenths of the depth all the way around. The finishing cut is started half way around from the start of the second cut, and is continued around the gear. Also, the machine is not stopped on the second or third cut until the complete cycle is finished.

Some of the work a gear jobbing shop should be prepared to handle is shown in the accompanying illustra-

tions. Fig. 1 shows a No. 3 Newark gear hobber equipped with lathe-type steady-rest to assure maximum support of the outer end of the solid pinion being cut. Fig. 2 shows the same machine with the tangential attachment, fly tooling a bronze worm wheel. The fly tool is an inexpensive substitute for a hob, where the quantities to be made at one time do not justify the making of a hob. It is suprising how quickly a worm wheel can be fly tooled.

On multiple-thread worms, if there are more than two, a star cutter is made. There are as many teeth in the cutter as there are threads in the worm. This saves indexing and gives more cutting edges.

Fig. 3 shows the end mill attachment of the No. 5 gear hobber, with a roughing hob (*A*) mounted in the attachment. Notice the coarse spiral of the flutes. This cutter is used on a number of different jobs. The finishing cutter (*B*) is a plate with two cutting edges; it is suitable for small quantities, but four teeth would be better.

Fig. 4 shows a No. 5 spur gear cutting machine cutting a pinion on the end of a long shaft. Pinions have often been cut similar to this where the outside diameter was the same as that of the shaft. These are used for bending rolls. In this case reverse the cutter and cut backwards. The machine next to the one on the long shafts is in operation on a ring gear strapped to arms which are in turn strapped to the faceplate of the machine.

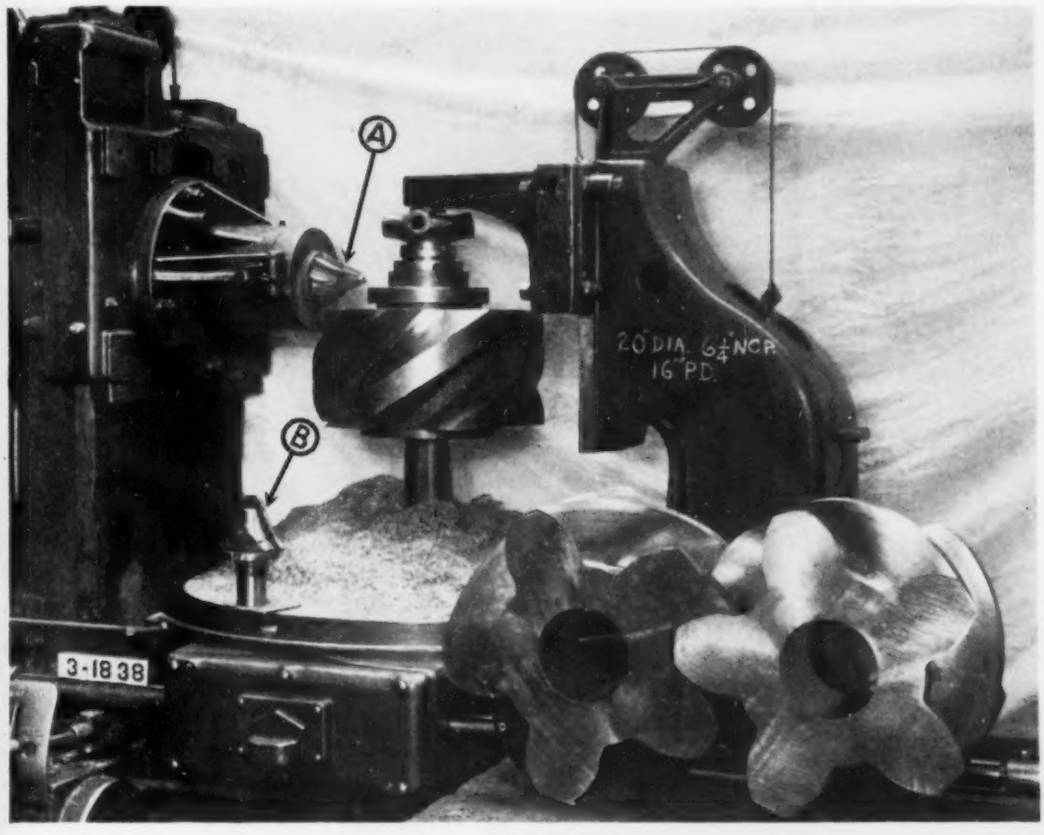


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FIG. 3—End mill attachment with roughing hob mounted in it. The finishing cutter for the same work is on the table of the machine.

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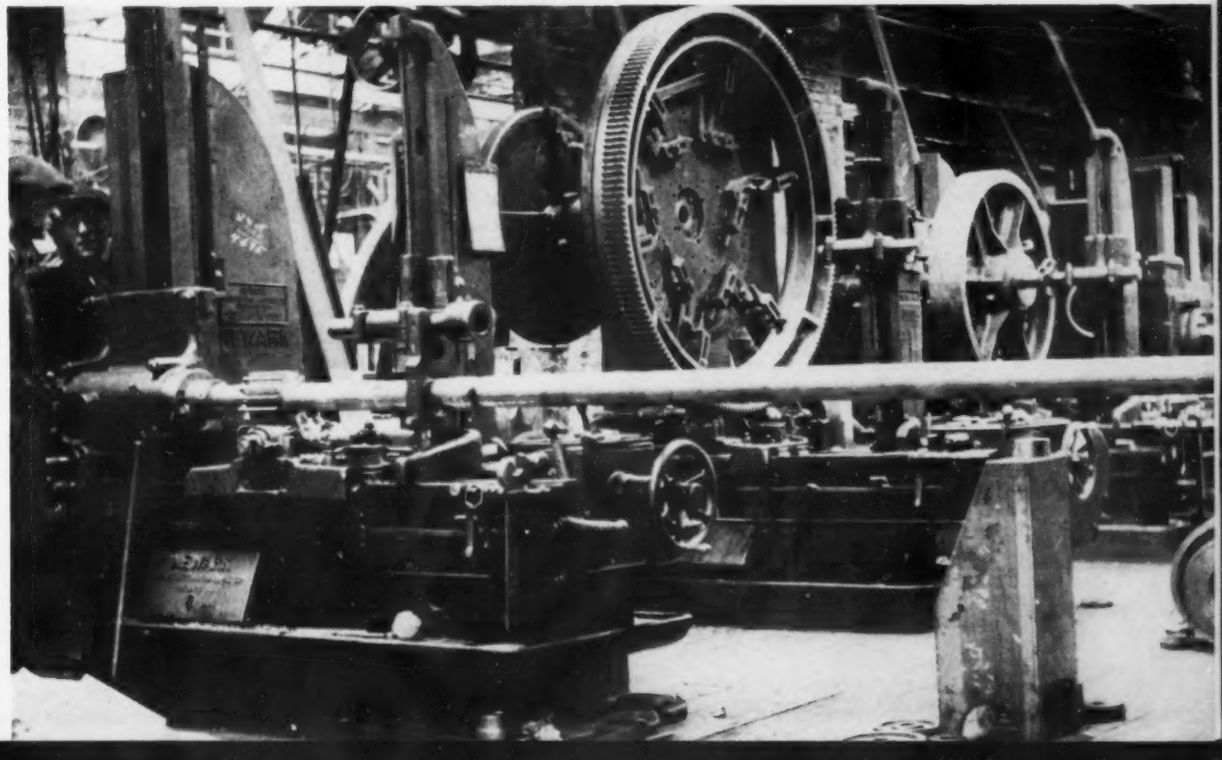

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FIG. 4—The spur gear cutting machine in the foreground is in operation on pinion at the end of a long shaft; the machine next to it is cutting a large ring gear mounted on a faceplate.

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Flow of

THE past decade has witnessed great progress in both the equipment used for hot and cold working of metals and also in the knowledge of basic principles underlying the flow of metals in the forming operations. This paper presents an abstraction and correlation of the present knowledge on the plastic flow of metal. In the first section last week, the author covered fundamental stress-strain relationships, the resistance to flow, and power consumption. Herein, in conclusion, the path or course of the deformation in the different working processes is considered, and data are presented on the effect of friction and lubrication.

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THE path or course of the deformation in the different working processes has been extensively investigated by several methods.[9] Composite test samples have been made from layers of slightly different materials, which are fastened together by means of inserted screws or bolts. The segregated regions in mild steel can also serve to follow the flow of this alloy. A very satisfactory procedure[10] which will reveal the flow qualitatively and also yield a quantitative measure is to cut the test sample of the metal in half, scratch or machine a square grating on the interior surface of one half and in the case of hot work fill the grooves with paint or a refractory material, such as graphite, to prevent welding. The two halves are then matched and rigidly assembled by means of bolts or wires, machined to size, if necessary, and subjected to the working process. The method has been used especially for extrusion experiments on a commercial scale, Figs. 10 and 11. Accurate measurements of the deformations of small test samples produced by working operations have also been made by this method, to calculate the actual work expended.[11]

The speed of deformation generally has little effect on the cold working processes.[12] The flow resistance increases slightly with the increasing rate of strain, Fig. 12. However, at high deformation speeds the heat generated by the working cannot be conducted away sufficiently fast, so that the actual temperature of deformation is raised with a corresponding decrease in flow resistance. The flow stress generally decreases almost lineally with increasing temperature down to a very low value at the melting temperature.

However, in some instances, a high rate of deformation may be detrimental. Thus, in any cold process, where the forming is produced by a tension of the metal (the different drawing processes, or rolling with front and back tension), high impact stresses in addition to the actual working stresses are momentarily created at the start of the operation and may cause rupture. Also, the tendency of soft steel sheet to form stretcher strains increases with an increasing rate of deformation, Fig. 12, and therefore slow starting speeds are beneficial for the forming of soft steel.

The determining factor in hot deformation is the rate of the metal flow, while the amount of deformation has practically no effect on the flow stress. The flow stress can be determined from compression tests (in per cent per sec.) corresponding to the actual working speeds. The quantitative effect of the rate of deformation on the flow stress varies with the metal and the temperature, see Figs. 13 and 14.

If the value of the flow

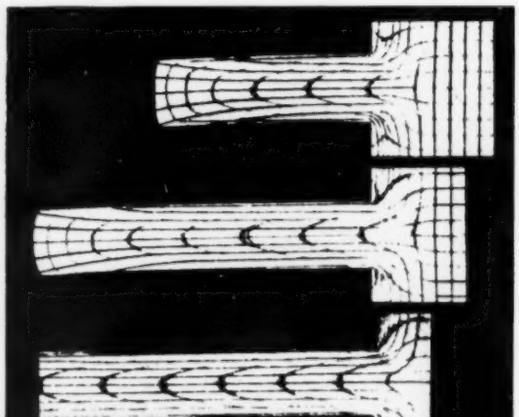

FIG. 10—The flow of metal in the extrusion of tin at room temperature.

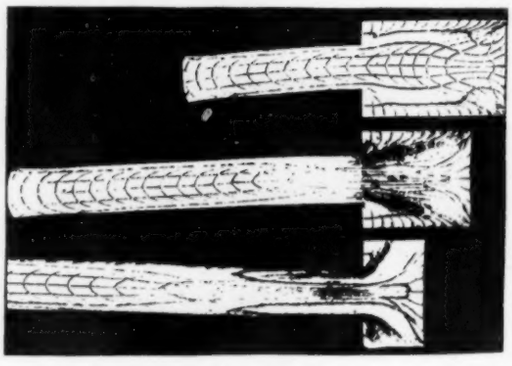

FIG. 11—The flow of metal in the hot extrusion of high brass.

[9] W. E. Remmers, Transactions, American Institute of Mining and Metallurgical Engineers, Institute of Metals Division (1930), pp. 107-120.
H. C. Jennison, Transactions, American Institute of Mining and Metallurgical Engineers, Institute of Metals Division (1930), pp. 121-139.
H. Unckel, *Journal Institute of Metals* (London), Vol. 61 (1937), pp. 171-196.

[10] G. Sachs, Spanlose Formung, Berlin, 1930, pp. 74, 85; C. E. Pearson, *Journal Institute of Metals* (London), Vol. 64 (1939), pp. 299-310.

[11] E. Siebel, *Steel*, Vol. 94 (1934), Nos. 12 to 15.

[12] J. Winlock and R. W. E. Leiter, Transactions, American Society for Metals, Vol. 25 (1937), pp. 163-205.

[13] K. Fink, Z. Berg-, Huetten- and Sal.-Wesen (1874), p. 200.

Metals

By GEORGE SACHS
Case School of Applied Science

stress k under specific conditions is known, the power consumption for a certain type of deformation, disregarding friction, can be obtained from the following considerations. In tension, for example, the work expended during a small elongation dl is:

$$dA = k \cdot f \cdot dl$$

and with a constant volume:

$$V = f \cdot l$$

It follows that:

$$f = \frac{V}{l}$$

and:

$$dA = k \cdot V \cdot \frac{dl}{l}$$

This gives the work consumed, assuming that k is constant:

$$A = k \cdot V \cdot l_n \frac{l_1}{l_o} = k \cdot v \cdot \epsilon_{max.}$$

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In the rolling process, where the only external force is the pressure of the rolls:

$$p = -k = -s_z$$

the deformation of a volume V = l·h·b (l = length, h = height, b = width) yields the same relation:[28]

$$dA = -k \cdot l \cdot b \cdot dh$$

$$dA = -k \cdot V \cdot \frac{dh}{h}$$

$$A = k \cdot V \cdot l_n \frac{h_o}{h_1} = k \cdot v \cdot \epsilon_{max.}$$

The product of the volume by the flow stress by effective deformation is the basic and minimum value for any calculation of the power consumption. The result is the power consumption for a frictionless and uniform deformation. The flow stress can generally be taken for all practical purposes as an average of the values at the beginning and at the end of the process.

The actual power consumption is always higher than this basic value. Two corrections should be added, (1) for the effect of the previously discussed heterogeneous deformation (see Fig. 9), and (2) for the effect of friction.

FRICTION AND LUBRICATION: A considerable part of the power consumed in a process is used to overcome the friction between the working tools and the metal. This portion of the work is particularly important, because it is expended to control the quality of the product and depends on more or less variable factors such as the die material, the surface condition of tools and stock, the design of the tools, the type of lubrication, the speed, etc.

The power required to satisfy the friction demands in a drawing process, for example, can be approximately calculated in a very simple manner according to Fig. 15. If no friction exists, a body of cross-section f_o transformed into a final cross-section f_1 will require a drawing force:

$$\xi_o = p \cdot \sin\alpha \cdot \frac{f_o - f_1}{\sin\alpha} = p \cdot (f_o - f_1)$$

where the angle α = the half die angle. Now assuming that the wall

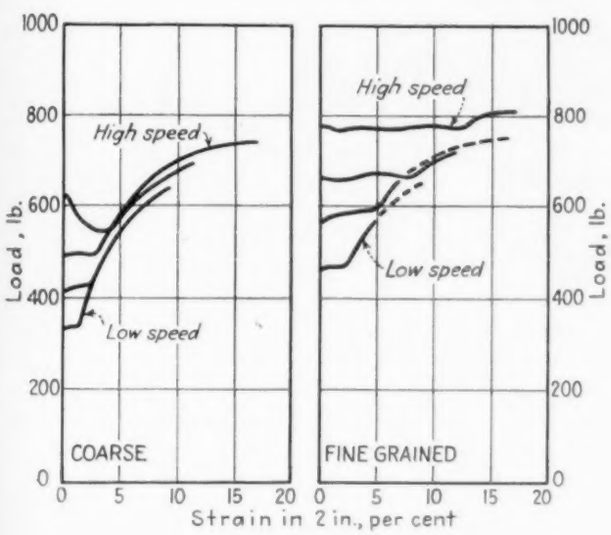

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FIG. 12—The effect of the rate of strain on the stress-strain diagram of soft steels. (Winlock and Leiter).

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AT RIGHT

FIG. 13—Effect of temperature and rate of strain on the flow stress of different steels in compression (Siebel). Rate 6 per cent per sec. (left), and 1000 per cent per sec. (right).

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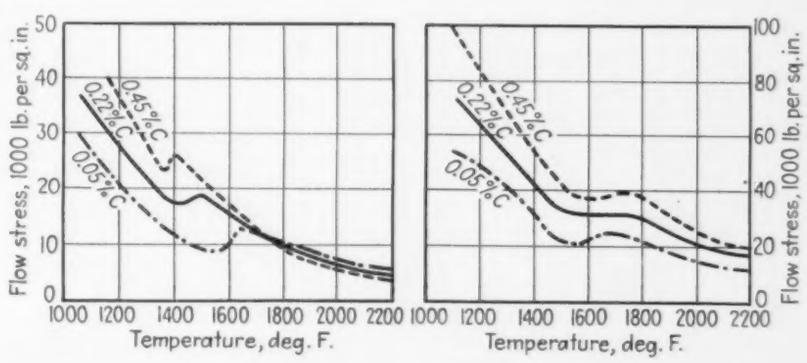

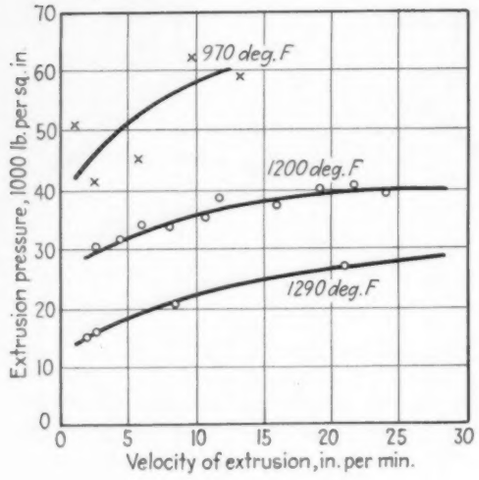

ABOVE

FIG. 14—Effect of temperature and rate of strain on the extrusion pressure required for high (60/40) brass.

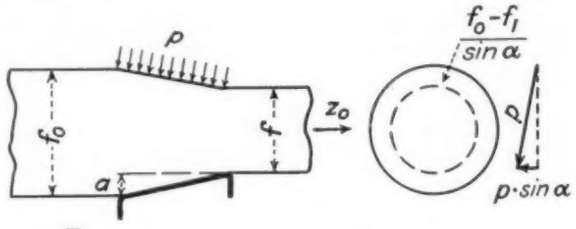

FIG. 15—Drawing force without friction.

pressure p is not changed when the friction $\mu.p$ is active on the die wall, the drawing force becomes, Fig. 16:

$$\xi = p\cdot(f_o - f_1) + \mu\cdot p\cdot\cos\alpha\cdot\frac{f_o - f_1}{\sin\alpha}$$
$$= \xi_o\cdot(1 + \mu\cdot\cot\alpha)$$

The friction effect is therefore increased by both an increasing friction coefficient and decreasing die angles. With a friction coefficient $\mu = 0.1$ and a (half) die angle of 6 deg., the power consumption for drawing is twice the frictionless value. However, the actual power consumed by friction is more complicated and requires considerable calculations, which will be discussed in detail for the individual working processes.

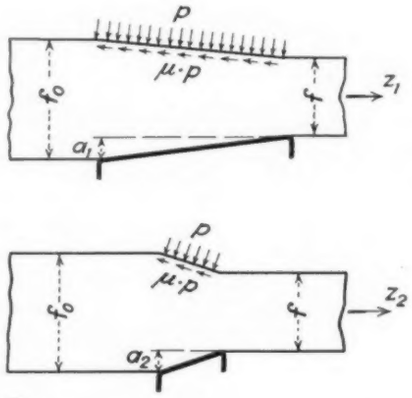

FIG. 16—Drawing force with friction.

Thus, as shown in Fig. 17, the force required for drawing wire through conical dies depends in a rather complicated manner upon the drawing conditions, and attains a minimum value at a certain die angle, other factors being equal. This may be explained by the described combined action of the different factors which contribute to the total drawing force, Fig. 18: (1) the minimum flow resistance required for the external change of shape, (2) the non-uniformity of the strain, and (3) the external friction. As previously shown, the non-uniformity of strain increases with increasing die-angle, while the total friction resistance decreases with increasing die-angle, thus creating the minimum at a certain die-angle.

In rolling, the action of friction determines, for example, the effect of different roll diameters.[14] Figs. 19 and 20. The unit roll pressure generally increases with the roll diameter, and this especially applies to the hot rolling of steel with rough rolls. However, the friction effect is small in cold rolling with polished and lubricated rolls.

Also, in most cases the friction is considered to be determined only by the conditions of stress, that is, the solid friction type. This relation appears to be justified from the observations that the power consumption for cold work is not appreciably affected by the rate of deformation, for example, in wire drawing.[15] In the case of a liquid friction, the drawing force would increase with the drawing speed.

Friction coefficients for various conditions have been determined by different methods. They can be accurately obtained only by using the theoretical relations, to be discussed for the specific working processes. In the rolling of carbon steels, the following friction coefficients have been found:[16] Hot rolling with steel rolls 0.4 between 700 and 1650 deg. F. (400 to 900 deg. C.), 0.3 at 1800 deg. F. (1000 deg. C.), and 0.2 above 2000 deg. F. (1100 deg. C.), and with cast iron rolls these values are increased about 50 per cent; and for cold rolling

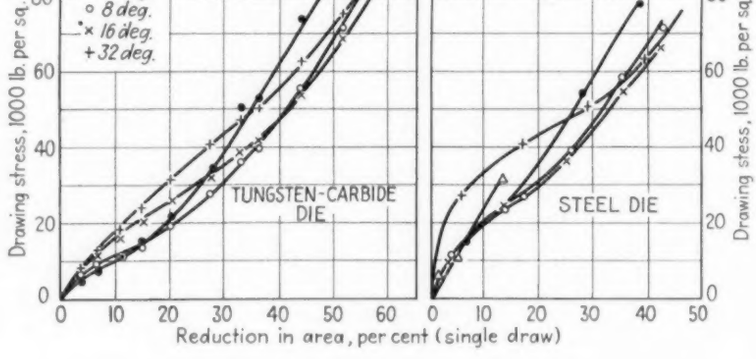

FIG. 17—Effect of die material, die shape, and reduction on drawing force for high (67/33) brass.

[14] E. Siebel, Kaiser-Wilhelm Institute, Eisenforsch, Vol. 12 (1930), pp. 225-244; Vol. 16 (1934), pp. 485-491.

[15] E. L. Francis and F. C. Thompson, *Journal Institute of Metals* (London), Vol. 46 (1931), pp. 313-351.

[16] W. Trinks, *Blast Furnace and Steel Plant*, Vol. 25 (1937), pp. 713-715.

[17] G. Sachs, Spanlose Formung, Berlin, 1930, p. 38.

A. Pomp and A. Koch, Mitt. Kaiser-Wilhelm Inst., Eisenforsch., Vol. 13 (1931), pp. 261-271.

[18] R. C. Williams, *Wire and Wire Products*, Vol. 10 (1935), pp. 145-146, 160.

[19] G. Sachs, Spanlose Formung, Berlin, 1930, p. 11.

[20] J. J. Trillat, Compt. Rend., Vol. 202 (1936), pp. 2134-2136.

[21] E. L. Francis, Carnegie Scholarship Memoirs, Iron and Steel Institute, Vol. 23 (1934), pp. 47-63.

[22] K. B. Lewis, *Wire and Wire Products*, Vol. 8 (1933), pp. 197-200, 219, 234-239, 243, 251, 266-269, 331-333.

[23] D. E. Washburn, *Wire and Wire Products*, Vol. 12 (1937), pp. 572-575.

[24] E. Siebel, *Steel*, Vol. 94 (1934), No. 2, pp. 24-25, 43; No. 3, pp. 27-29.

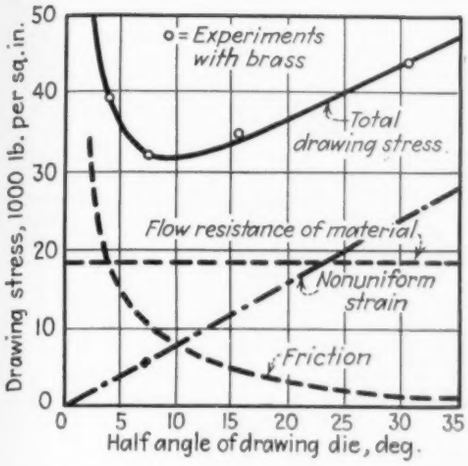

FIG. 18—The effect of die shape on the stress required for wire drawing

the value is 0.04 with high speed polished rolls and flood lubrication, ranging up to 0.15 for rough rolls without lubrication. In wire drawing, friction coefficients have been computed from certain experiments that investigated the effect of different shaped dies:[17] Steel, with tungsten carbide dies and different lubricants, 0.03 to 0.06; brass, with tungsten carbide dies and rape oil, 0.06; brass, with soft steel dies and rape oil, 0.10. Another source[18] gives estimated values between 0.07 to 0.29 for the drawing of copper and stainless steel with tungsten carbide dies, the lower values for wax and the higher for mineral oil lubricants. In deep drawing the following coefficients have been determined:[19] Copper, with rape oil, 0.15; brasses, with rape oil, 0.08 to 0.12; bronze, with rape oil, 0.14; aluminum, with tallow, 0.10.

The mechanism of a lubricating action in a working process is very involved. The classical theory of lubrication assumes that the contact between metal and die is interrupted by the lubricant. Actually, however, there is always some direct contact between the metal and the tool. It has also been found, by X-ray and electron diffraction investigations,[20] that a type of unstable compound is formed between the metal and the lubricant at the interface, in such a way that a very thin layer, perhaps only one molecule thick, functions as a sliding cushion. This explains the well-known fact that organic lubricants have a higher lubricating capacity than neutral mineral oils. However, organic lubricants are often unstable, attack the metal, and form stains and residues which are difficult to remove.

Recently, mineral oils, with a higher lubrication capacity, have been developed by special processes or by the introduction of some constituents, which are not entirely neutral. Some of the corrosion problems of high speed bearings are attributed to this chemical condition. The viscosity of the oil can be varied within wide limits, and generally the more viscous lubricants are used for high pressures, high temperatures or slow working speeds. The most viscous and effective lubricant is beeswax, with or without an addition of 10 to 20 per cent graphite. It is used for lubricating the punches in the extrusion of aluminum and bronze tubes. Tallow and castor oil are also potent lubricants, which are used for very drastic deformations and for metals which tend to scour and drag. Viscous mixtures of lime, or sodium soap with mineral grease and oil are used for the breakdown wire drawing operations. In the rolling of sheet, strip, foil and light fabricating operations, very liquid oils are selected, such as emulsions of 10 to 20 per cent "water soluble" oil in water. These oils are also extensively used as efficient coolants. Special oils which do not form any residue or reaction products on heating are desirable if the material is to be annealed without cleaning. In such applications also care has to be taken that the heavy lubricants from the bearings do not get on the rolled metal. Many devices have been developed to obtain uniform lubrication.

Oils are also used to a large extent to prevent corrosion of the material in the atmosphere. Water soluble oil has been found to be very efficient in this respect, as it takes care of the water formed by condensation during transport and storage. However, different types of lacquers or oils forming solid coatings are generally preferred for corrosion protection, as liquid oils accumulate dust and dirt. Such corrosion resistant oils and lacquers are usually poor lubricants and have to be removed if the metal is subsequently fabricated.

Alloys which are difficult to work because of severe dragging, such as stainless steel (18/8) wire, may be coated with a soft metal, such as lead.[21] The main function of a soft coating is probably to replace the highly strained surface layer by a more ductile metal. The copper coating of carbon steel[22] also serves this function, while the beneficial effect of a lime coating is attributed to its porosity,[23] which is partially retained even at a very high pressure.

A rather large proportion of the total power used in a plant is consumed by friction in the bearings, gears, etc. Here, also, proper lubrication and friction reducing measures, such as the introduction of roller bearings, are recommended. Furthermore, the friction losses during the actual working operations may be much higher than the usually calculated losses from idling.[24]

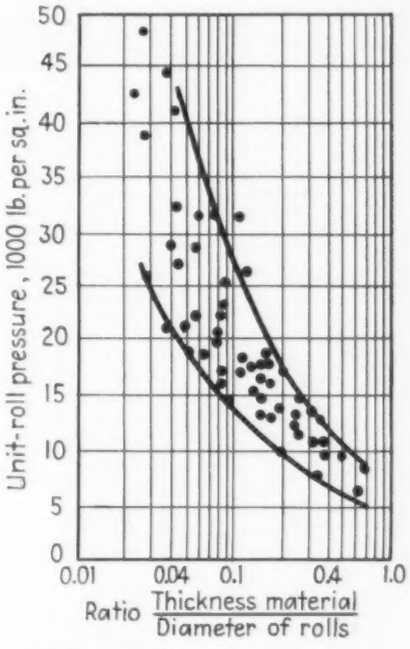

FIG. 19—Effect of roll diameter on hot rolling of steel structures (Siebel).

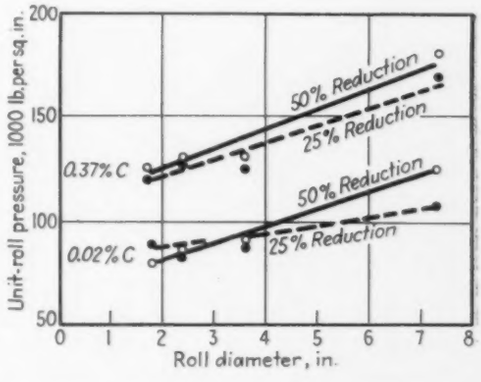

FIG. 20—Effect of roll diameter on cold rolling of steel strip (Siebel).

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THIS equipment is used to electroplate aluminum die castings.

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Electroplating on ALUMINUM

o o o

By ADOLPH BREGMAN
Consulting Engineer, New York

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METHODS of treating aluminum surfaces to obtain an adherent deposit and types of plating solutions, particularly the promising Travers process.

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FEW problems in metal finishing have received more attention than electrodeposition on aluminum, and few problems have been more difficult to solve. The advantages of providing aluminum with the variety of finishes available by electroplating have always been manifest, but the problem of adhesion of the plate to the basis metal has always been a stumbling block.

The methods of plating aluminum in the past have always been based on (1) the removal of the oxide coating, and (2) roughening the surface of the basis metal to allow the electrodeposit to be keyed or anchored in place. A variety of methods have been used:[1]

Sand-blasting to prepare the surface; cleaning in a hot, mild alkaline cleaner followed by a water rinse, then a short dip in a 5 per cent HCl solution to neutralize the traces of residual alkali and also to etch and clean the aluminum surface, then rinsing and dipping in an etching solution; electrodepositing a coating of iron on the aluminum, and then nickel plating over the iron. Other preliminary treatments include forming an immersion deposit of zinc by dipping the aluminum into sodium zincate before nickel plating; anodic oxidation of the aluminum followed by partial cathodic reduction to produce a suitable surface.

Zinc coatings on aluminum are obtained from cyanide or sulphate solutions. Cadmium is deposited on aluminum from a cyanide solution. This coat is said to be a good protector for aluminum alloys but unsatisfactory for pure aluminum.

The Aluminum Co. of America has developed methods for plating aluminum with zinc, chromium and nickel.[2] Zinc is plated in thin coats from a special cyanide solution. The zinc coat alone is said to be fairly resistant to corrosion but when covered by other plates is likely to blister or peel on exposure to moisture by rea-

[1] "Protective Films on Metals," by Ernest S. Hedges, 1937 edition, pp. 328-332.

[2] "Finishes for Aluminum," 1938, Aluminum Co. of America, Pittsburgh, pp. 47-55.

son of the difference in potential between zinc and other metals. The procedure is first to clean in a mild alkaline cleaner, using from 1 to 3 oz. per gal. each of trisodium phosphate and sodium carbonate, then rinsing in cold water followed by treatment in a 5 per cent HFl solution, again rinsing in water and then plating in:

Zinc cyanide	4 oz.
Sodium cyanide	4 oz.
Ammonium hydroxide	4 oz.
Peptone	⅛ oz.
Water	1 gal.

Chromium in a very thin plate is applied directly to aluminum in the ordinary chromium bath at about twice the current density used for plating chromium on nickel. The cleaning procedure calls for a mild alkaline cleaner, hydrofluoric acid dip, rinses, etc. Some of the casting alloys call for additional treatment in nitric and sulphuric acids or in nitric and hydrofluoric acid. The chromium plate is dull, but when plated from a hot solution, 118 deg. F., it is more easily buffed than from cold solutions.

For nickel plating, it is stated that sand-blasting is not sufficient to prepare the surface of the work for an adherent plate. The surface must have undercuts which can be produced only with special etching reagents. The procedure recommended is as follows:

(1) Clean in a mild alkaline cleaner 1 to 3 oz. each of sodium carbonate and trisodium phosphate. Temperature 180 deg. to 200 deg. F.

(2) Rinse in clear cold water.

(3) Acid cleaning for 10 or 15 sec. in a 5 per cent solution of hydrofluoric acid.

(4) Rinse in clear cold water.

(5) Roughen the surface in a solution suitable for the aluminum alloy being plated.

(a) For commercially pure aluminum:

Nickel chloride	36 oz.
Hydrochloric acid	0.2 gal.
Water	1 gal.

Temperature, 90 deg. F.
Time of treatment, about 15 sec.

(b) For aluminum alloy sheet and wrought material:

Hydrochloric acid	1/3 gal.
Water	2/3 gal.
Manganese sulphate	1/2 oz.

Temperature, 90 deg. F.
Time of treatment, 15 to 30 sec.

(c) For castings:

Nitric acid	3 parts.
Hydrofluoric acid	1 part.

Temperature, 75 deg. F. to 80 deg. F.

Time of treatment—die castings, 15 to 30 sec.; permanent mold castings, 30 to 90 sec.; sand castings, 60 to 120 sec.

(6) Rinse in clear cold water.

(7) Nickel plate in a suitable bath, such as:

Nickel sulphate	19 oz.
Magnesium sulphate	10 oz.
Ammonium chloride	2 oz.
Boric acid	2 oz.

Temperature, 90 deg. to 95 deg. F.
Current density, 15 amp. per sq. ft.
ph (colorimetric), 5.8 to 6.

All of the methods just described rest on the removal of the oxide film, and roughening the surface of the aluminum. But they have their limitations. The coating is not permanently adherent. If the oxide film is not completely removed from the aluminum, the deposit peels quickly. If it is removed, according to one explanation, the fresh aluminum surface, upon introduction into the plating bath, immediately receives a layer of the coating metal by displacement, an immersion coat, because of the position of aluminum in the electro chemical series, anodic to practically all of the commercial plateable metals. Immersion coats have poor bond; consequently, the adherence of the plate to the aluminum has been short-lived, and the plating of aluminum by any of these methods has never been accepted commercially.[3]

The Travers Process

Breaking away completely from the traditional point of view, the process recently developed by William J. Travers[4] of Krome-Alume, Inc., Lock-

ELEVENTH in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

[3] A probable exception to this is the new Moly-Black molybdenum-nickel electroplating process developed by E. I. du Pont de Nemours & Co. This black finish is said to plate satisfactorily onto aluminum after an alkaline bath cleaning.—Ed.

[4] U. S. Patent 1,071,761. Aug. 28, 1934.

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A VARIETY of die cast aluminum parts plated with nickel and chromium.

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port, N. Y., is said to overcome this old difficulty by attacking it from the opposite direction. Accepting the premise that the problem resides in the pretreatment of the aluminum base, this process, instead of removing the oxide film, increases it by electro chemical treatment. The first step, therefore, is the formation of an anodic coating, which permits the current to flow in one direction only, from the anode to the work, but resists the flow in the opposite direction. An adherent plate of nickel may then be deposited over the anodic coating.

NICKEL plated aluminum can be successfully soldered. The illustration shows an aluminum piston to which has been soldered an ordinary piece of brass by the use of an ordinary 50-50 mixture. At first the piece was soldered to the left side of the piston and then removed by the application of sufficient force to rupture the bond between the solder and the brass, but not between the solder and the nickel plate, which was deposited by the Travers process.

The exact nature of this anodic film is not yet understood, but the inventor of the process describes it as a complex composition of an aluminum oxide and a gaseous component. Probably, also, its composition varies with the electrolyte used, the current density and the type of current used (direct or alternating). Alternating current is recommended for its freedom from polarization and the simplicity of voltage regulation. The voltage range is from 20 to 50 depending upon the aluminum alloy to be plated. The lower voltages are used for castings and the higher for the higher purity aluminum and the aluminum-silicon alloys. It is also interesting to note that the characteristics of the anodic film vary also with the composition and type (cast or wrought) of the aluminum alloy being plated.

Plating Procedure

No etching or roughening of the surface is involved. The work to be plated first requires polishing to a good luster to obtain the smooth surface necessary. It is cleaned in a mild alkaline cleaner which will not etch the surface. (The cleaners must be free from silicates.) A cold solution of sodium cyanide is recommended as safe although perhaps slow. As soon as the work is free from waterbreaks, it is rinsed and ready for the anodic film.

The anodizing bath recommended consists of 4 oz. of oxalic acid per gallon of water. The parts to be treated are left in the bath for about 10 min. at 50 volts a.c. (for the first few seconds a lower voltage is used). Current density is not over 5 amp. per sq. ft.; temperature 60 deg. to 70 deg. F. As the film builds up, the temperature of the electrolyte tends to rise and the current flow is retarded. The temperature should be kept down by cooling coils and the impressed voltage increased to keep up the current density and the rate of formation of the anodic film.

The work is then carefully rinsed in cold water and transferred to a solution of 8 oz. of sodium cyanide per gallon of water for several minutes, the time depending on the alloy of which the work is composed. Experience in judging the appearance of the film, aided by indicators, teaches the operator the optimum length of time for this operation for the specific job in hand. The parts are then ready for rinsing in cold water and plating.

Although any plate can be deposited on the properly prepared aluminum part, the recommended coat is nickel, on which any other metal may be plated. The plating operations involved are the conventional methods generally employed. The adhesion is said to be of an extremely high order and parts plated with nickel and then chromium have a high resistance to wear.

Samples of nickel-plated aluminum with the nickel partially removed show the anodic coating underneath but do not disclose the mechanism by which the nickel adheres to this anodic coat.

Equipment Required

As can be judged from the data given, the equipment required for the preparation of aluminum for plating is simple and conventional and can be obtained from any plating equipment supply house, with the exception of the current supply. This, as stated, is a.c., using 50 volts instead of the low voltages used in regular plating operations. The 50-volt current is provided by a transformer of proper size (usually 5 to 20 kw., although one 60 kw. installation is now in use). This transformer has a tapped secondary so that the secondary voltage may be regulated from about 5 volts to 50 volts maximum. Usually a switch is mounted near the anodic tank for controlling the secondary voltage most conveniently. The current may be supplied at any standard frequency.

Costs

In the matter of costs little specific information is available as yet, only general figures being obtainable. It is clear, however, that the only additional cost of this process over the standard plating procedure is the preliminary treatment of the aluminum articles. The electrolyte in this preliminary anodizing treatment costs about 5c. per gal. and is, as previously stated, used on the parts for about 10 min., using alternating current at a maximum voltage of 50. This is followed by immersion in another solution, also costing about 5c. per gal., for a period of several minutes. The aluminum article is then ready to plate in any nickel solution. It has been estimated that the cost of preparing aluminum for plating is about 0.25c. per sq. ft.

Uses

To list the uses for plated aluminum would be impossible. Moreover, the advantages of combining the light weight of aluminum with a wear resistant and corrosion resistant surface are too obvious to need explanation. They are especially evident, however, in aluminum die castings and in the fabricated parts that go into assembled manufactured products, in which an important additional advantage is the fact that aluminum parts plated with even a thin coat of nickel can be soldered with ordinary solder and flux, thus increasing enormously the range of applicability of aluminum parts in fabricated products.

INLAND REBUILDS FIRST STACK

ON Christmas Day, 1939, the No. 1 blast furnace of the Inland Steel Co., aged 32 years, went into blast after a rebuilding job which increased its daily capacity from around 500 tons to about 700 tons.

Commissioned by Inland in 1906 to build the original No. 1 stack (see photo), Arthur G. McKee & Co., Cleveland, was also in charge during reconstruction. Inland regards its No. 1 blast furnace with considerable sentiment, for this stack not only produced the first pig iron in Indiana, but was also responsible for Inland's becoming a completely integrated steel producer in September, 1907.

Daily production of the original furnace in its last campaign ranged from 500 to 550 tons daily, which was considered reasonably satisfactory. However, a somewhat higher coke rate was necessary than obtained on the better of Inland's other furnaces. The hearth diameter of this old furnace was 16 ft. 3 in.; height, 84 ft. 11 in.; large bell diameter, 11 ft. 8 in.; and stockline diameter, 15 ft. 8 in.

An analysis indicated that the height was deficient, and that the bosh should be shortened and made steeper. The hearth cooling staves, after 14 years' operation, probably would not last out another run, while downcomers, bustle pipe and hot blast main were in need of extensive repairs.

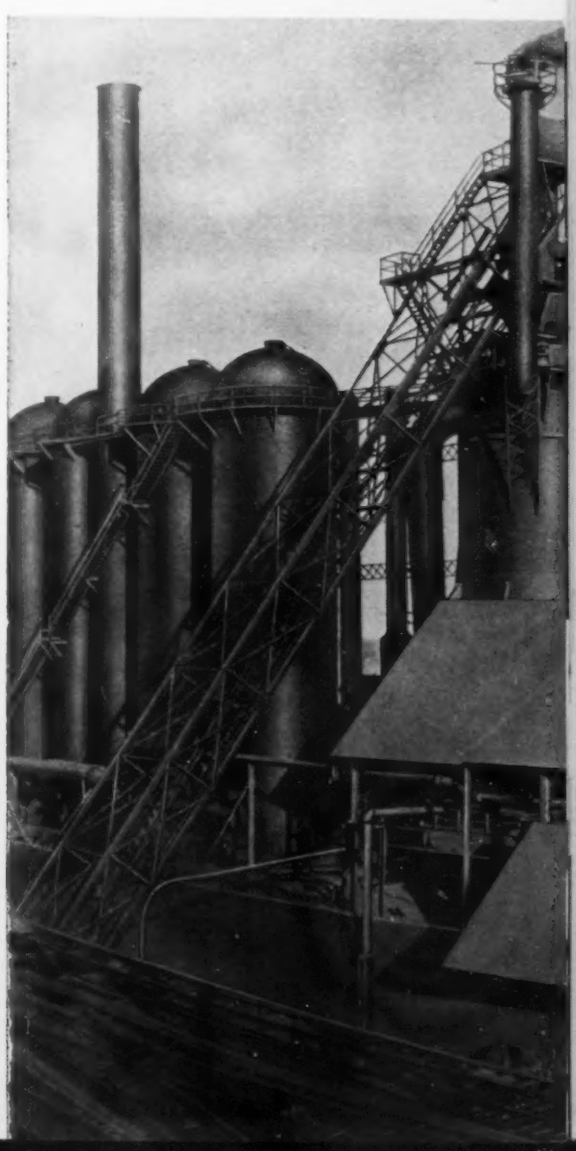
The McKee engineers finally concluded that for a 550-ton normal production, with Inland's raw materials and under conditions at the site, a furnace with a 20-ft. hearth diameter should be installed. A study of the savings based upon estimated differences in cost between this plan and two other schemes indicated a very satisfactory return on the extra capital investment. The savings at a 550-ton daily rate were reflected in the main by a lower coke consumption, lower blowing cost and lower flue dust production.

In addition, at a sacrifice of economies resulting from normal operation, and at a possible maximum production of about 750 tons a day during periods of high pig iron demand, such as the last quarter of 1939, the return on the additional investment was found to be further enhanced to the extent of paying for itself in four to eight months.

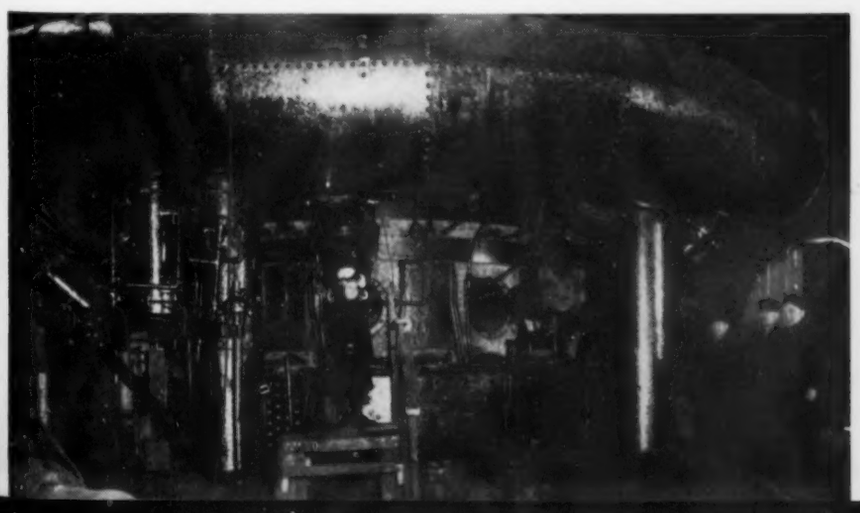
The No. 1 furnace was thus rebuilt with a 20-ft. hearth. The height from iron notch to the top of hopper ring was set at 94 ft., giving an effective height from centerline of tuyeres to stock line of slightly over 72 ft. and an effective working volume above tuyeres of approximately 25,000 cu. ft. Height of bosh was set at 11 ft., diameter at top of bosh, 23 ft. 6 in., and bosh angle at nearly 81 deg. The inwall batter was developed to be 0.854 in. a foot, consistent with a stockline of 17 ft. 6 in. and a large bell of 13 ft. 3 in. diameter.

The stack is cooled above the mantle by six rows of replaceable inwall coolers. At an elevation 10 ft. 6 in. below the stockline is located a platform for access to inwall thermocouples and openings through the shell and inwall brickwork for traversing the stock to determine gas distribution and analysis.

The stove equipment originally installed consisted of a group of four center combustion units, 22 ft. diameter by 93 ft. high, lined with checkers having large openings. Of these, the No. 4 stove was previously replaced by 24 ft. diameter by 100 ft. high side combustion stove, having small checker openings. A fifth stove, lined with small checkers, had also been previously added, which was used on either No. 1 or No. 2 furnace. During the rebuilding of the furnace, No. 1 and 2 stoves were abandoned by disconnecting them from the hot blast main, and No. 3 stove was replaced by a stove shell duplicating No. 4 stove, and lined with small checkers. Hot blast mixing is accomplished by use of the Vincent mixing system.



MRS. MADELINE BLOCK STRAUS, daughter of P. D. Block, Inland's president, and wife of H. H. Straus, an Inland vice-president, is shown here (below) as a girl participating in the lighting ceremonies of Inland's original No. 1 blast furnace on Aug. 31, 1907. The original furnace is shown at the right.



PUNCHING INSTRUMENT

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By BRADLEY THOMPSON

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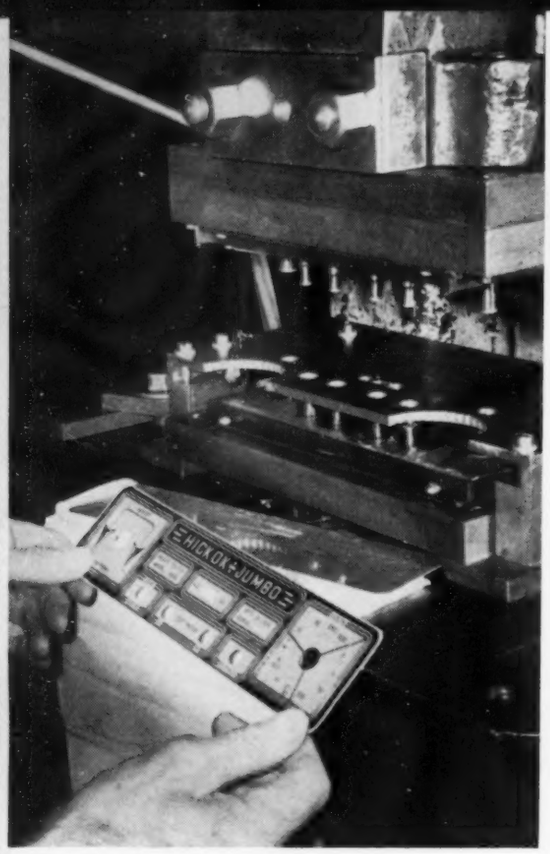

FINISHED Cerromatrix punch and one of the panels punched. Finger holes were cut out of the front edge of the master plate, which is also used for a stripper.

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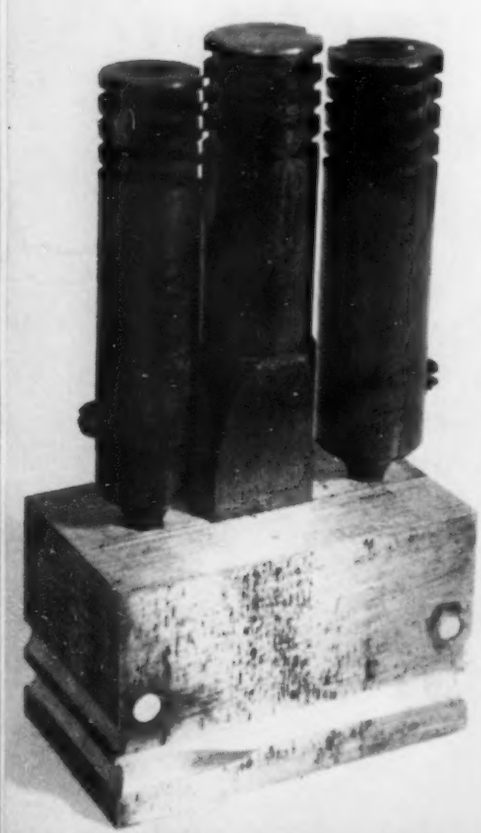
INDIVIDUAL punches are fitted together and hardened. Note notches around base of each piece. The two set screws hold small removable punches that are used in only one of the panels.



IN the manufacture of service instruments the Hickok Electrical Instrument Co. has the problem of punching the metal panels on which the meters and associated equipment are mounted. These panels may be etched and lacquered, or finished by the silk screen printing process. Therefore, great care in handling is necessary to avoid scratching. Drilling is particularly difficult as the drill often turns up a burr that digs into the finish.

When the quantities of panels are small, as is often the case, it is not economical to build a multiple hole piercing die by the conventional methods. Also, minor changes may be made in the panel layout from time to time, and the cost of building new tools to accommodate each change would be exorbitant. Therefore, it became necessary to use a method of die construction which would not have these disadvantages.

Many panel piercing dies have been constructed over the past several years that have proved to be economical in first cost and sufficiently flexible to permit the relocation or addition of holes without the necessity of completely scrapping the old die and building a new one. The cost of construction is low enough that it can be written off on a smaller production than would be possible with the older methods. Furthermore, the work can be done by any good machinist as it does not require the skill of a toolmaker.

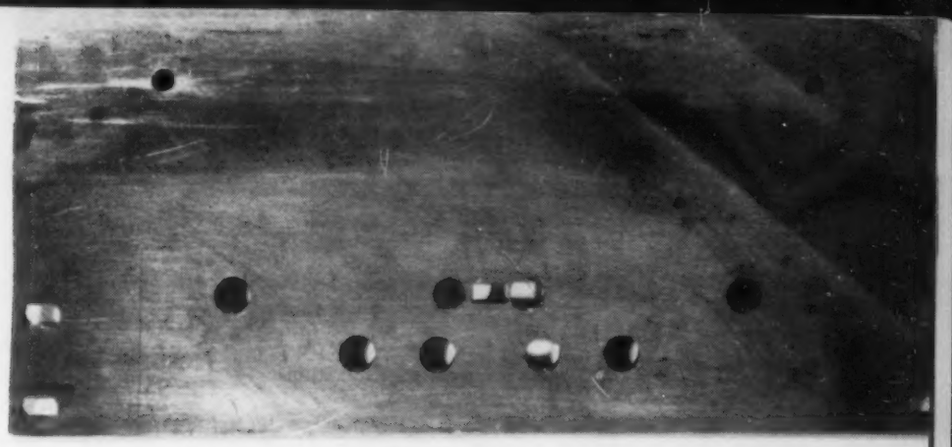
The completed unit consists of the individual punches and dies, previously fitted together and hardened, which are held in place with Cerromatrix. Cerromatrix, especially developed some years ago for this type of work by the Cerro De Pasco Copper Corp., is an alloy of bismuth, lead, tin and antimony. The alloy looks like solder but is different in many respects. It is very hard when set and will not peen in service, loosening its grip on the steel. It melts at a low temperature eliminating any danger of softening the punches, and it expands slightly as it sets assuring a tight grip on the pieces it holds.

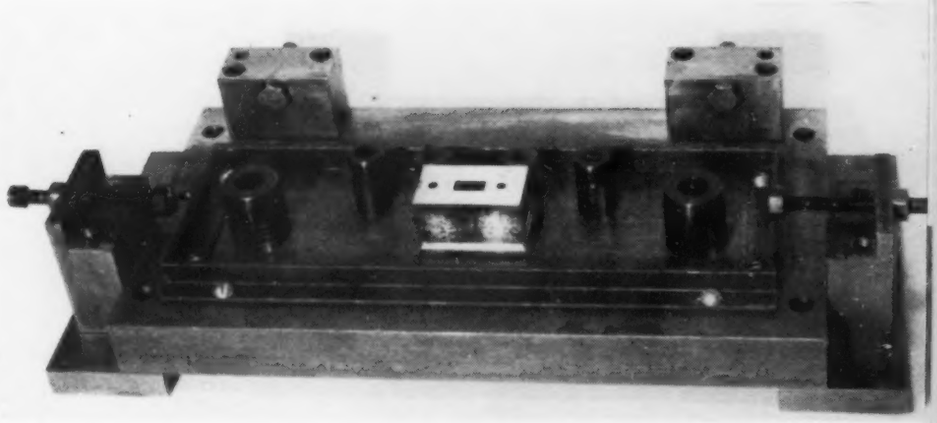
To show how these dies are made, the step-by-step construction of a typical unit will be described. The individual punches and dies are first made and fitted together. The base of each is notched so that the Cerromatrix can get a good grip and keep them from turning. The matrix does not form a bond with the steel. It merely grips the pieces like a vise so it is necessary to have some irregularities in the surface which it holds. The punches and dies are then hardened in the usual way. Next a master plate is laid out and drilled, to hold the punches in the proper location while the Cerromatrix is poured. This plate should be drilled to a close fit around the punches so they will be held in a vertical position.

A 1-in. plate of cold rolled steel is cut to size, a little larger all around than the area in which the dies are to be located. The extra space on this plate is used to hold the panel guides, and there is also room available for clamping to the bed of the press. The area in which the dies will be is surrounded by a fence of ½-in. angle iron. This fence must be solid so that the Cerromatrix, which expands as it cools, will be forced in around the dies. In some of the first punches made, trouble with loose dies was traced to flimsy fence construction. Since using angle iron construction, no loose die trouble has been encountered.

Adjustable panel guides are screwed through tapped holes in blocks of cold

PANELS...





rolled steel which are secured to the base plate. These blocks must be removable as they would interfere with grinding the dies. The clearance hole in the bolster plate of the press was not large enough to clear all the holes in this punch so the base plate is mounted on parallels. A few self-tapping screws are fastened in the base plate around each of the dies to anchor the Cerromatrix — the head of each screw is left sticking up a fraction of an inch above the surface of the plate.

With the dies set in place, the master plate is laid over them and held securely to the panel guide supports with screws. The punches are inserted through the holes in the master plate into their respective dies and the set-up is ready for pouring of the Cerromatrix.

If the alloy were to be poured in on the cold steel it would be chilled too fast—therefore, the base plate is heated to approximately 250 deg. F., using

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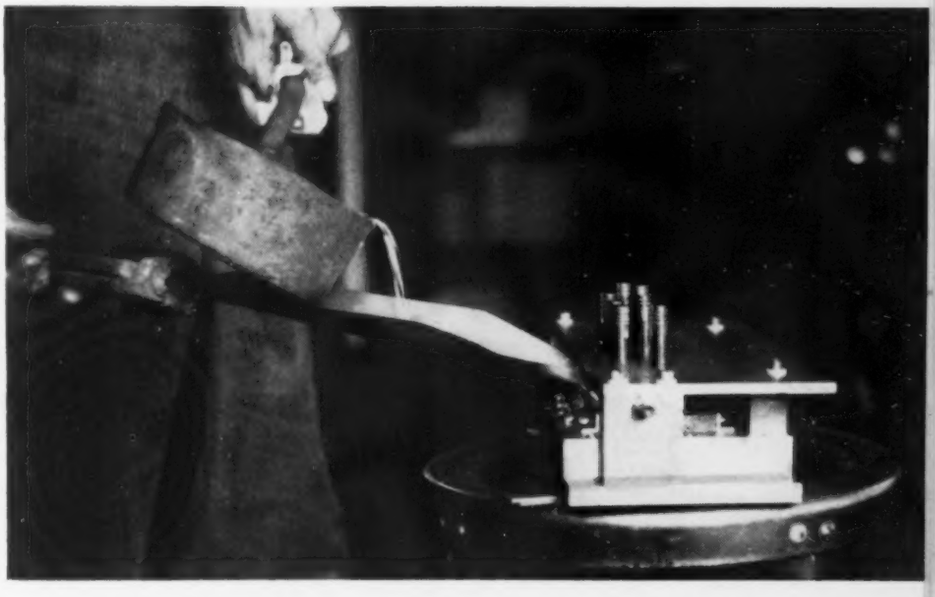
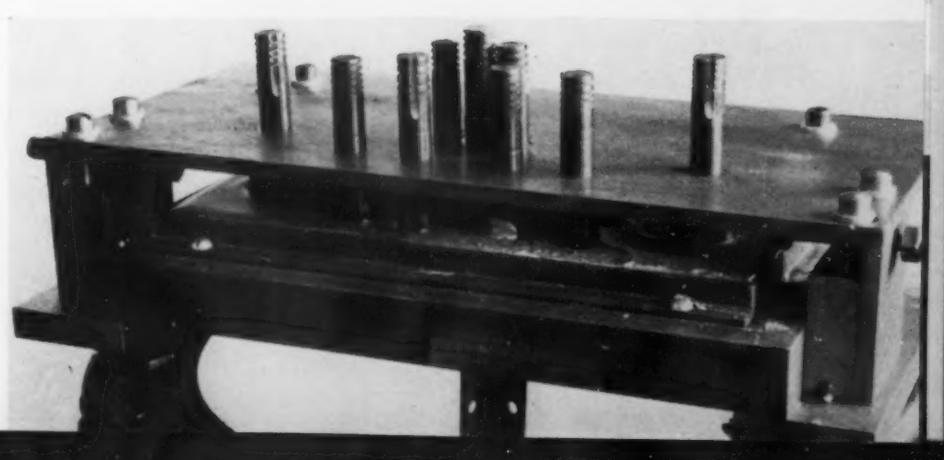
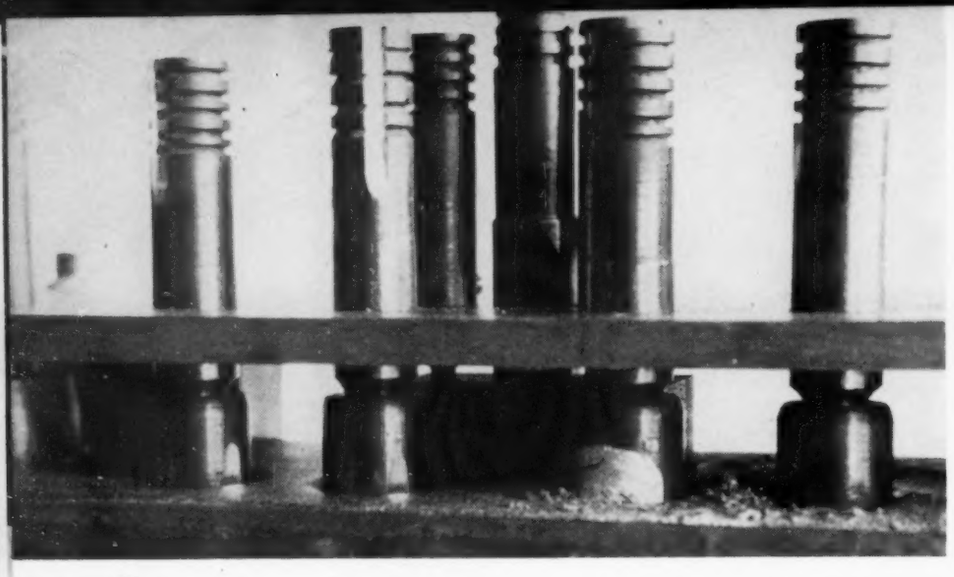




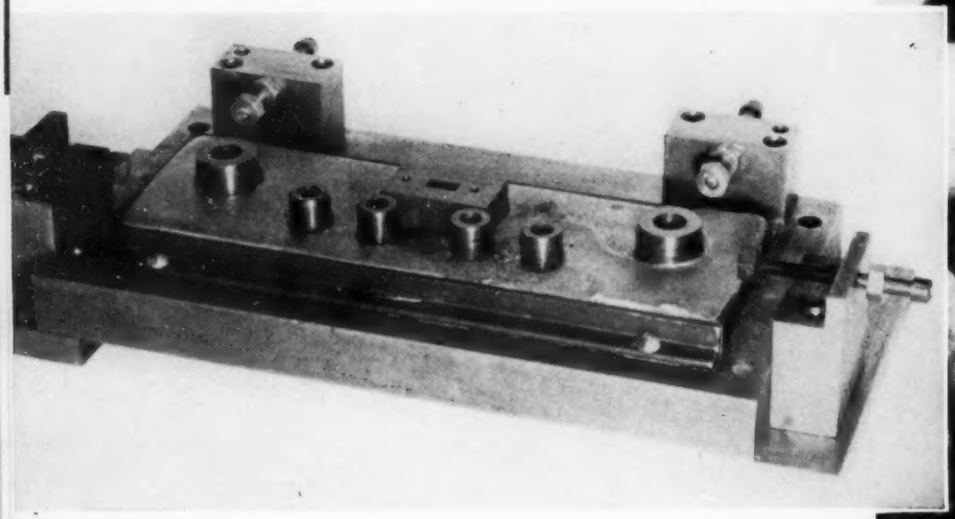
MASTER plate (top photo) holds the punches until Cerromatrix sets. This plate determines the location of the holes and must be laid out accurately. Die foundation is 1/2-in. plate of steel with framework of 1/2-in. angle iron surrounding area in which Cerromatrix is to be poured (upper center). Molten Cerromatrix is poured in around the dies on the preheated plate (lower center). The unit is allowed to cool normally for several hours. Cooling should not be forced (lower photo).



CLOSE-UP view of the dies in their support of Cerromatrix.

a blow torch. A few drops of water on the top plate will indicate when it is getting too hot. The Cerromatrix is melted in a ladle over a flame and poured in around the dies until it fills the area around them level with the top of the angle iron. An improvised funnel will facilitate pouring the metal in under the top plate. The scum that forms on top of the melting Cerromatrix should be stirred back in, not skimmed off. Several hours should be allowed for cooling and aging.

After the metal has cooled completely, the punches and top panel are removed and clearance holes are drilled



AFTER cooling the dies are ready to be sharpened.

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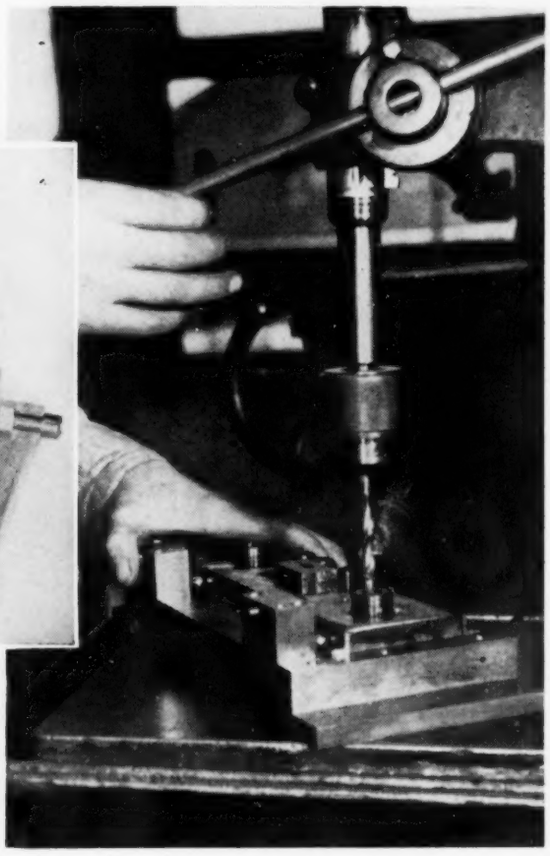
PUNCHES are set in oversized holes in 1-in. plate of steel, which is mounted on a punch holder of proper size. Temporary spacers maintain proper distance between the two plates.



CLEARANCE holes are drilled through the base plate to pass the slugs. The hardened dies make good drill bushings.

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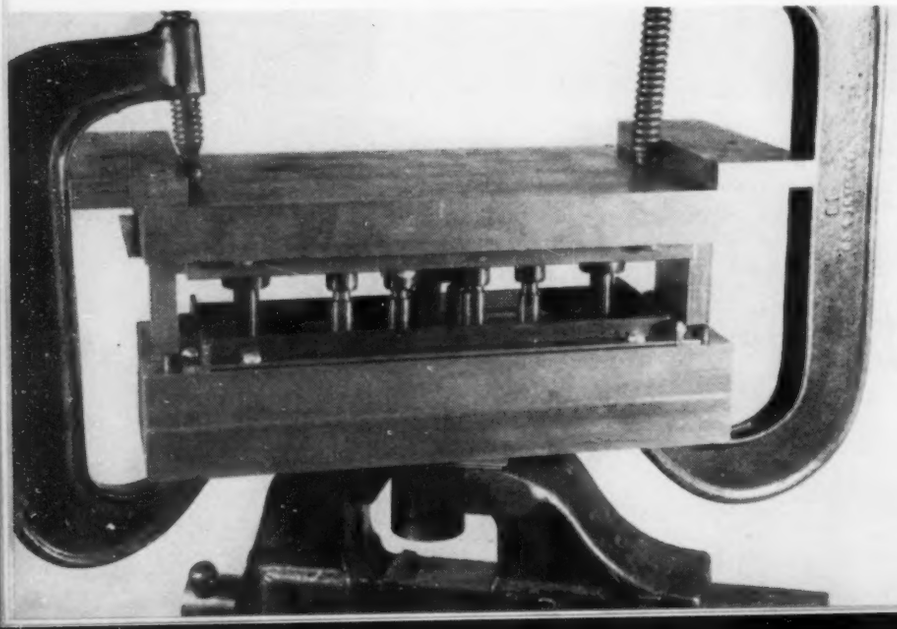

through the base plate, using the dies for drill bushings. These holes could have been drilled oversize before the dies were set. If there are any odd shaped holes, such as the rectangular one shown in the accompanying photograph, the clearance holes should be drilled first to avoid hand filing.

The punch plate is prepared in much the same manner as was the plate for the dies, but it was desired to set the punches a little deeper in the Cerromatrix to give them more support on the sides. This was done by setting them down in oversized holes in a plate of cold rolled steel the same size as the punch holder. A few notches were gouged out of the side of each hole with a portable electric drill to anchor the alloy. The plate was then screwed to the punch holder. The punches are inserted in the dies and the punch holder is placed over them with their bases up in the holes in the steel plate. Two parallels are used to separate the plates which are securely clamped together before the whole assembly is turned over placing the punch holder on the bottom. After the punch plate is heated to the proper temperature, Cerromatrix is poured in around the punches.

The operation is thus completed. After the punches and dies have been sharpened, the master plate is screwed in place again and used for a stripper. Such method of die construction is of particular value to manufacturers who have small runs of articles to be punched, although experience has indicated that these dies will stand up on the long runs as well. One such die, shown in one of the accompanying photographs, has been in use for nearly two years and has punched several thousand panels of various materials, including 0.060 in. steel.

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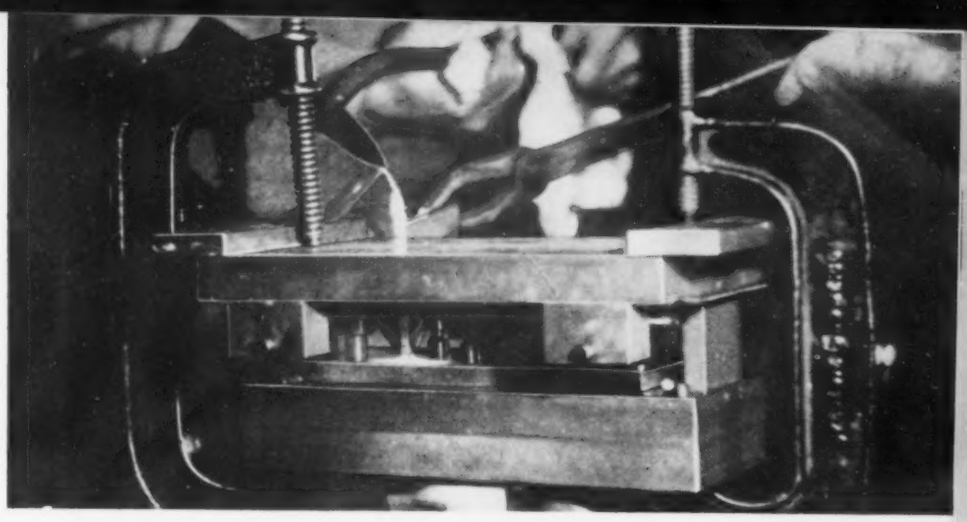

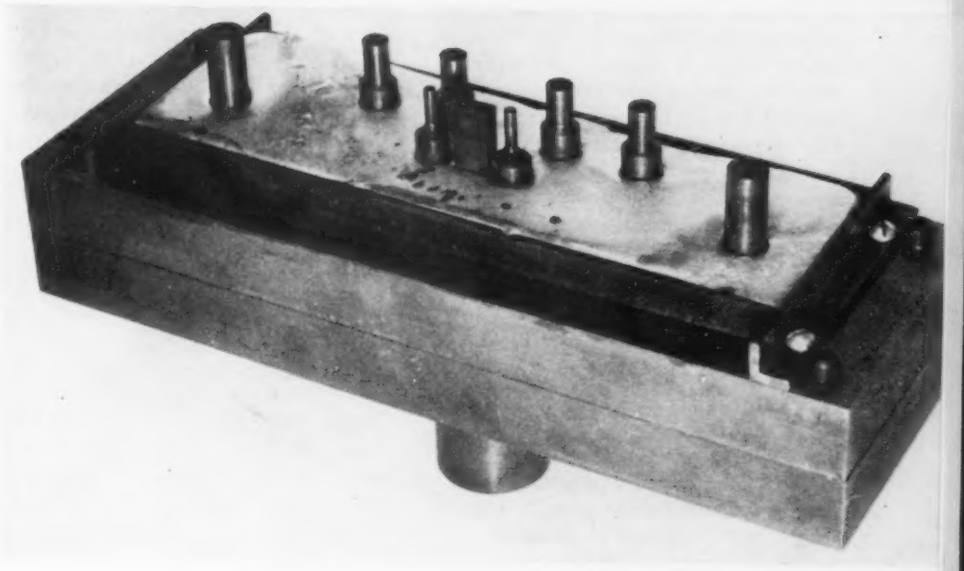

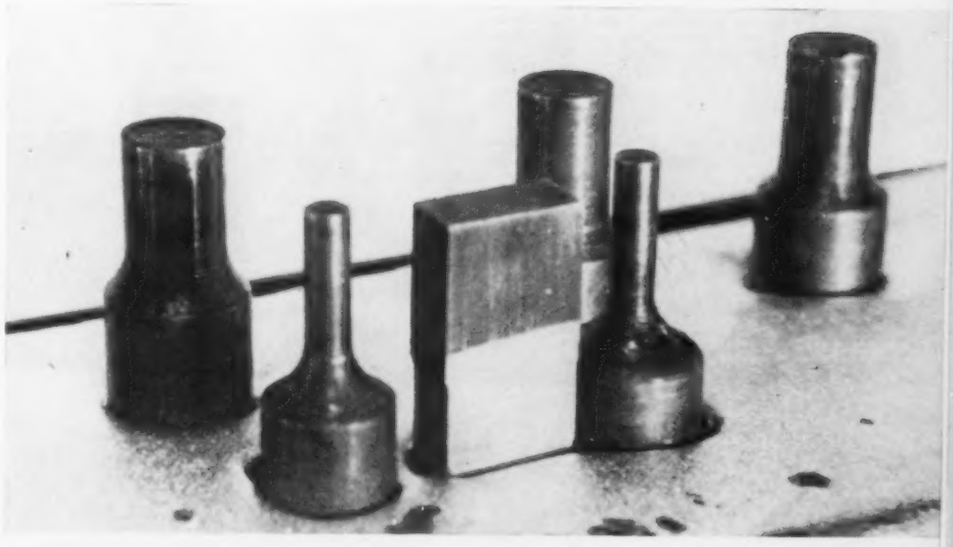

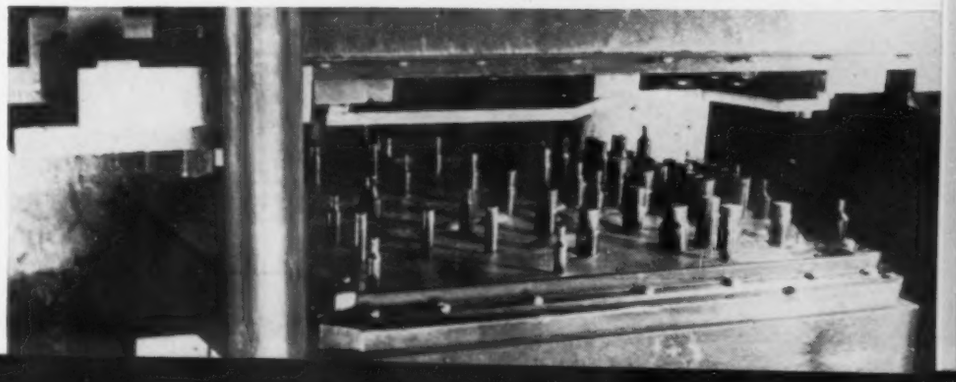

THE cold steel is preheated (top photo) before Cerromatrix is poured on it. A few drops of water on the top plate will indicate when it is getting too hot. After Cerromatrix sets, the two plates are separated and the punches are ready for grinding (upper center). Close-up view of punches surrounded with Cerromatrix. The setscrews holding the two small punches in the foreground have been covered with metal, but this can be melted away with a soldering iron (lower center). The largest die built so far by this method. It punches 60 holes. Several thousand panels of various materials, running up to 0.06 in. steel, have been punched (lower photo).

WHAT'S NEW IN MATERIAL

FROM gasoline powered industrial trucks to stacking boxes for parts in process, this current review of recent announcements of the makers covers a wide variety of material handling equipment. The center control fork truck is becoming more popular. A farm tractor has been converted for industrial haulage, and a hydraulic drive has been applied to an industrial diesel locomotive. Several new types of crawler mounted cranes and shovels have appeared, the latter adapted for dragline work in open-pit mining operations. A new form of controller has been developed for a.c. hoist motors, using dynamic braking for lowering. Portable roller conveyors are announced for use in the shipping room. Finally, progress is recorded in stacking boxes, bins, and cabinets for handling parts in process and in serving the assembly line.

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LATEST addition to the line of industrial trucks manufactured by the *Baker-Raulang Co.*, Cleveland, is a gasoline-powered fork truck known as type KM (non-telescoping) or type KMH (telescoping), both of which are available in capacities of 4000 and 6000 lb. The engine is a 4-cylinder Hercules industrial engine, rubber mounted to reduce vibration. Heavy-duty industrial type transmission and clutch are used, the gearbox providing two speeds forward and two reverse. The power axle is the standard Baker worm drive, which has been used for many years in Baker electric trucks. Rear axle is of the wide angle steer type. Hydraulic brakes are provided on the drive wheels and all controls are of the automotive type. Travel speeds are normally governed at 7 miles per hr.

Lifting and tilting motions are accomplished by a hydraulic system consisting of a gear pump driven continuously from a power take-off and connected to the lifting and tilting jack cylinders through suitable control and relief valves. Lifting speeds are up to 30 ft. per min. and lowering speeds to 75 f.p.m. Forks may be had in any length desired. The non-telescoping truck has a fork lift of 70 in. and the telescoping model up to 124 in.

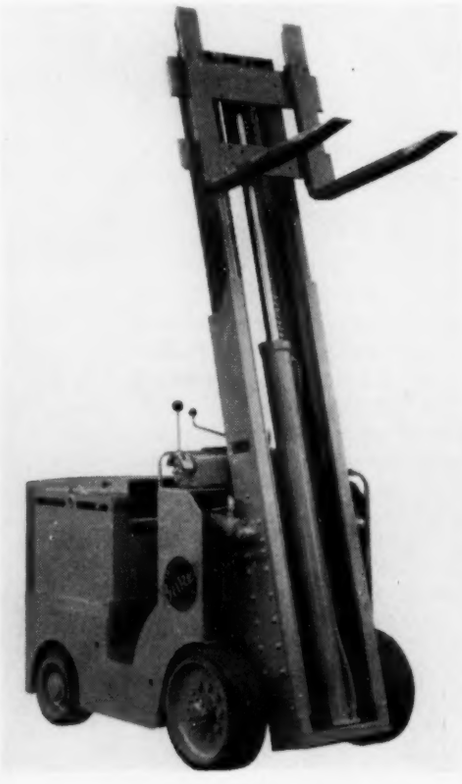
THE same general type of hydraulic lifting mechanism has also been applied to a new series of center

AT RIGHT

HYDRAULIC power elevation and tilting is featured in the new type JOM, series F Baker center-control fork trucks, built in capacities from 2000 to 7000 lb. Frames are of high tensile steel plates, arc welded, while the uprights are machined channels of abrasion resisting alloy castings. Hoisting speeds are up to 35 ft. per min. at full load; lowering speeds, 100 ft. per min.

BELOW

THE new Baker type KM gasoline-powered fork truck, made in both none-telescoping and telescoping types, is available in capacities of 4000 and 6000 lb. The overall height is 88 in. to permit entry into a boxcar.



HANDLING APPARATUS

By FRANK J. OLIVER
Associate Editor, The Iron Age

control *Baker-Raulang* fork trucks known as the type JOM, series F and built in capacities of 2000 to 7000 lb. These trucks are available in tilting or non-tilting, telescoping or non-telescoping models. Since these are storage battery powered trucks, however, the geared pump is driven by a separate electric motor. The control is arranged so that putting the control handle into the lifting position opens the valve and starts the pump motor. The tilting system is also hydraulically actuated from the same pump and motor, but has separate valve control. In the telescoping models, the uprights and the jack cylinder are so designed that the forks will lift 24½ in. before the inner telescoping uprights start to move, a valuable feature when the overhead clearance is limited as in box car work.

Axle drive and steering mechanism is similar to that used in the type KM trucks. On trucks of 4000 lb. or over, all wheels are mounted on tapered roller bearings and hydraulic brakes are provided on the drive wheels. On the smaller trucks, drive wheels are mounted on ball bearings and the travel brake is on the motor shaft. The overall length of these trucks has been kept to a minimum to permit maneuvering in narrow aisles, but the wheelbases have been kept as long as possible consistent with the lengths.

HYDRAULIC lifting equipment is also featured in the new *Baker* series F Hy-Lift trucks of midget size, but built up of standard heavy duty units. These new units are built in capacities of 1½ and 2 ton, the latter having a fully compen-

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FOR particular application in multi-storied buildings where load limitations are in effect, this new model A-1360 center-control fork truck is being offered by the Mercury Mfg. Co., Chicago, in 2000-lb. capacity. The truck is unusual in that the driver is located in a seated position where he has good vision and is well protected. Vehicle may be had with or without the tilting feature and is furnished with either high lift to 63 in. or telescopic lift to 115 in. Collapsed height is 83 in. Hoist and tilt systems are hydraulic types. Drive axle is a double reduction spiral bevel and spur gear combination, with full floating drive shafts and Timken mounted wheels. Three speeds are provided in either direction.

AN S-shaped resistance fixed to the prods of this G-E cell tester acts as a load supplier and also as a spring for adjusting the distance between the prods so as to fit any storage battery cell. Meter is located on top of the handle for best visibility. Sold by the General Electric merchandise department, Bridgeport, Conn., and bearing catalog number 3126754, the new tester replaces at a lower price a non-adjustable tester.

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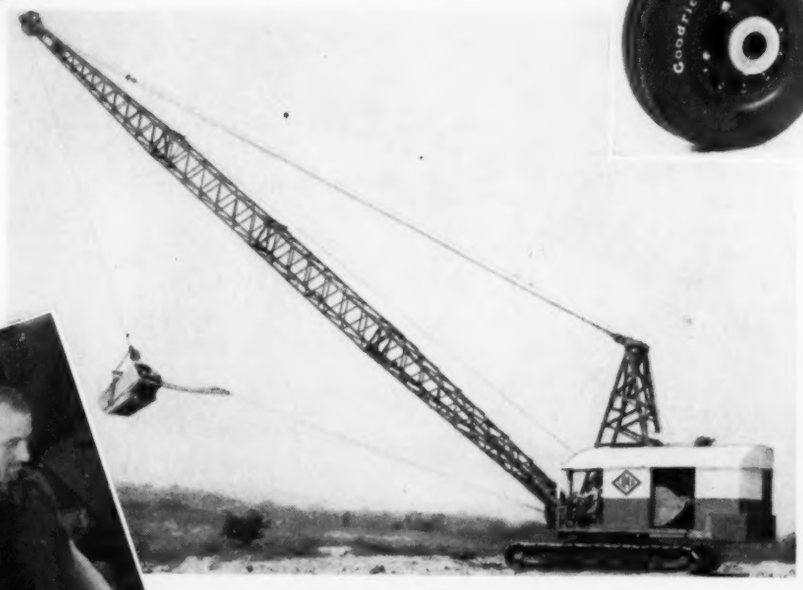
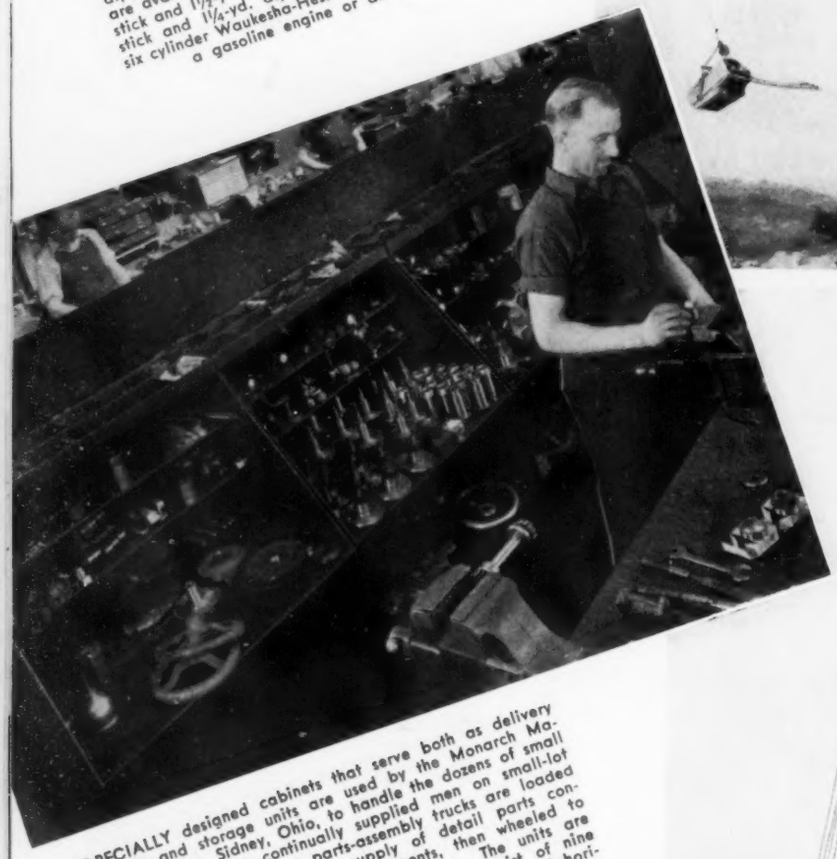
BELOW

MODEL 1B Allis-Chalmers industrial tractor shown at work in a foundry. Short and compact, it develops 13.5 hp. at the drawbar. The structural steel frame surrounding the engine and radiator can be used as a pusher.

LORAIN 80 is the name given a new 1¾-cu. yd. excavator built by the Thew Shovel Co., Lorain, Ohio. This machine is available with a complete line of interchangeable boom equipment as a shovel, dragline, crane, clamshell and back-digger. Effective length of the shovel boom is 24 ft. 8 in. and it is equipped with an 18-ft. dipper stick, but two long-range stripping shovel booms are available, one consisting of a 25-ft. boom with 25-ft. stick and 1½-yd. dipper; the other, a 30½-ft. boom, 25-ft. stick and 1¼-yd. dipper. Unit may be powered by a six cylinder Waukesha-Hesselman oil engine, a full diesel, a gasoline engine or an electric motor.

LOAD carrying capacity of a solid tire is said to be combined with the lightness and high cushioning qualities of a pneumatic tire in the new Goodrich Silvertown cushion type tire. It has no valve, requires no inflating and is puncture-proof. At present, it is available in two sizes, 6 x 2.00 in. and 8 x 2.50 in., and is interchangeable on the same wheel with single tube pneumatic tires of like size. It is adaptable for light hand trucks, trailers and similar industrial vehicles.





SPECIALLY designed cabinets that serve both as delivery trucks and storage units are used by the Monarch Machine Tool Co., Sidney, Ohio, to handle the dozens of small parts that must be continually supplied men on small-lot sub-assembly lines. These parts-assembly trucks are loaded in the stock room, with the supply of detail parts conveniently placed in handy compartments, then wheeled to positions alongside the workmen's benches. The units are of all-welded sheet steel construction and consist of nine vertical compartments of different sizes, topped by 12 horizontal 6 x 6-in. sections. At the base is a 15 x 36-in. compartment 27 in. deep for extra large parts and storage of the sub-assemblies when they are completed. The units stand 4 ft. high.

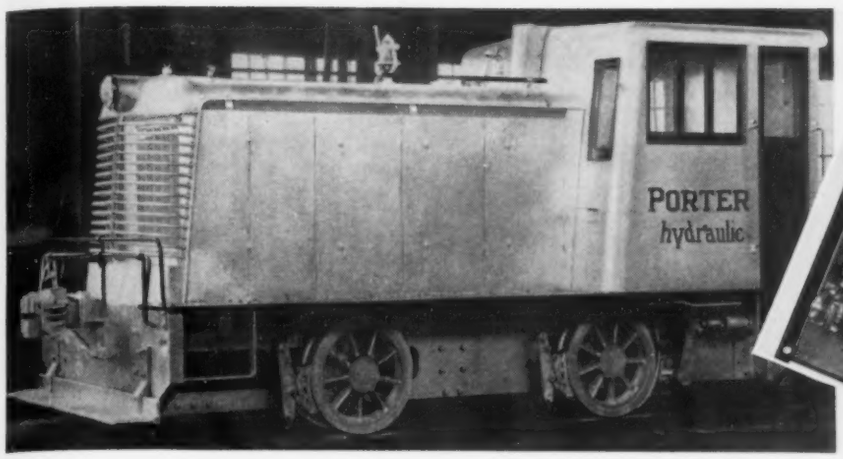
ABOVE

LIMA type 1201 is a combination shovel and dragline and is especially adapted to quarries, strip mines and heavy construction work. When equipped as a standard shovel, it carries a 30-ft. boom, 20-ft. dipper handle and a 3-yd. bucket. For special work, such as open-pit mines, the machine can be furnished with a 42-ft. boom, 32-ft. dipper stick and 2½-yd. dipper. Type 1201 can easily and quickly be converted in the field for dragline or crane service and can be furnished with either diesel, oil or electric power. Clutches, brakes and drums are of extra large diameter. Hoist clutches are equipped with vacuum power assistors which make possible the lowering of the load with the clutch engaged. Helical cut gears are used throughout, and roller bearings are used at all vital points.

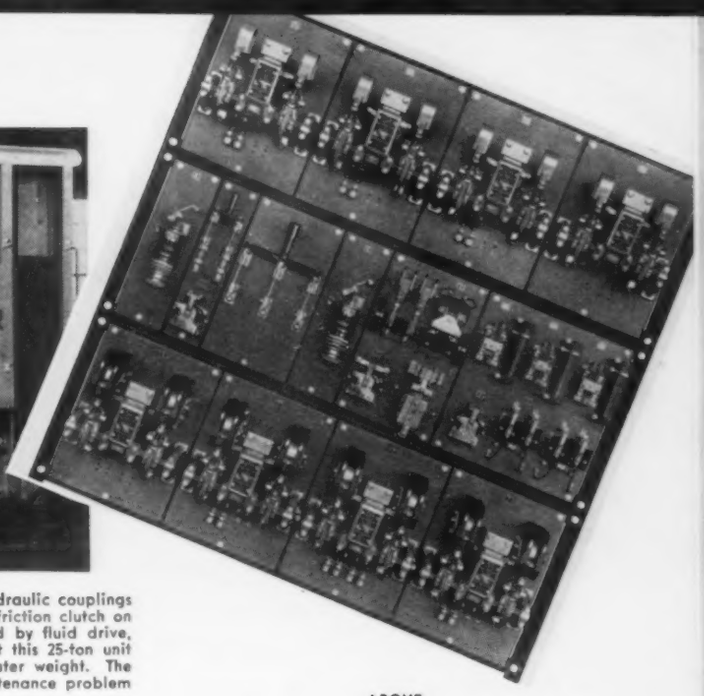
o o o

AT LEFT

MODEL 71 is a new crawler mounted crane of 40-ton capacity designed by the Northwest Engineering Co., Chicago, primarily for handling and setting steel or piling and other work requiring extreme versatility as to boom position and line control. These features are obtained through the use of four drums, including a worm driven boom hoist. A special folding gantry that can be lowered provides ample overhead clearance when traveling. Regular Northwest features are retained, such as feather-touch clutch control, helical gear drive, anti-friction bearings on high speed shafts and uniform pressure swing clutches.

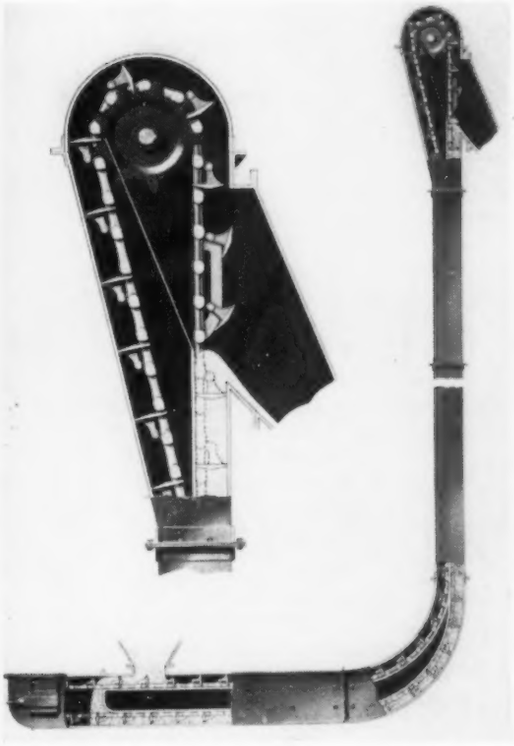


A TURBO-TRANSMISSION, consisting of a torque converter for low gear and two hydraulic couplings for intermediate and high gear respectively, takes the place of the conventional friction clutch on this new Porter 25-ton diesel-hydraulic locomotive. Since all the power is transmitted by fluid drive, the application of power to the drivers is smooth and continuous, with the result that this 25-ton unit will start loads that would normally require a conventional locomotive of much greater weight. The diesel engine is relieved of all shocks, gear shifting is eliminated and the clutch maintenance problem of mechanical drive locomotives is avoided.



ABOVE

TYPICAL EC & M dynamic lowering controller for hoist motion of cranes driven by a.c. motors. With this control it is possible to obtain lowering speeds as much as 50 per cent above the synchronous speed of the driving motor.



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MASS-FLO elevator-conveyor announced by the Jeffrey Mfg. Co., Columbus, Ohio, for handling all kinds of granular material, such as coal and chemicals. The unit consists of a steel casing through which solid pivoted flights, spaced at intervals on a single strand of chain, move the material in a solid mass or with a partial load. The enlarged view shows how the flights are discharged of their load by means of a tripper. The conveyor is self-loading and self-cleaning. It is said to handle material with very little agitation and hence little degradation of the product.

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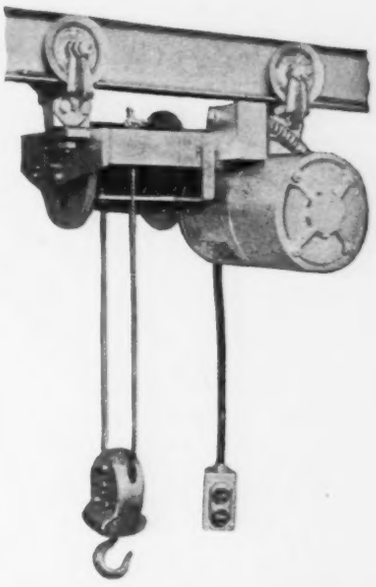


ALL castings are made of aluminum alloy in a new line of Electro Lift light weight aluminum hoists, made in capacities of ⅛ to 3 tons. Corresponding hoisting speeds are the same as on the standard line made by Electro Lift, Inc., 30 Church Street, New York. Hoist has a worm drive from a ball bearing motor, the design giving close headroom and silent operation. Control may be either rope or push button type. Drum may be equipped with a traveling rope guide to prevent crossed cables when the load is pulled at an angle from the vertical. Top and bottom limit switches may also be provided. The hoists are suitable for use in the presence of steam or acid fumes because of the corrosion resistance of the aluminum alloy.

sating, tandem trailing axle and the former a single trailing axle. In the tiering models, non-telescoping lifts are available up to 10 ft. Another variation is a low-lift model in which the platform lifts to 23 in. above the floor. Ordinarily the platforms are 7 in. high in the lowered position. The overall width is 32½ in., and with a platform 48 in. long, the overall length is 93⅜ in. with the driver's step folded. Travel speeds are up to 6 miles per hr.; lifting speeds up to 20 ft. per min.

Industrial Tractor

A NEW model IB gasoline powered tractor has been designed by the *Allis-Chalmers Mfg. Co.*, Milwaukee, as an industrial tractor and is built low, short, and powerful to handle all types of work in foundries, manu-

(CONTINUED ON PAGE 67)

THIS WEEK ON THE ASSEMBLY LINE

By W. F. SHERMAN
Detroit Editor

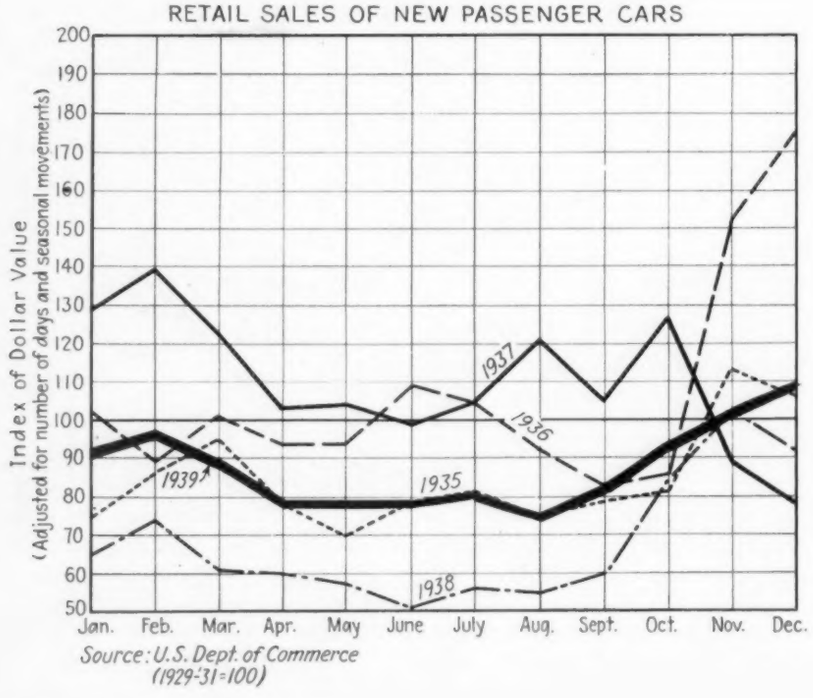
. . . Assembly schedule decreases spread evenly through industry . . . Spring budget of major producer indicates good rate of activity . . . Briggs active on aircraft engine, hoping to branch out from stamping business . . . Two makes of light cars continue to stir interest . . . Very thin babbitt bearing coming into automotive picture . . . Graham ready to resume production.

DETROIT—Interest continues to center on automobile output—with its probable effect on the level of steel production constituting one of the important reasons for watching the auto production curve.

The outlook for February and even for March has already been clearly outlined by reactions in schedules, spread almost evenly among the plants in the automobile industry. This scaling down has not been severe. It is intended to bring shipments of new cars in line with retail deliveries to keep field stocks on a level plane, awaiting the upward movement of auto sales in the spring. This decision has been followed by a general tightening of schedules and releases for vendors.

In the past week automobile production was reduced to 101,240 passenger cars and trucks, against 106,400 in the previous week. Production is still far higher than the 78,410 units in the corresponding week last year, according to Ward's Automotive Reports.

Reductions are noted in the output of virtually every plant. Ford held steadiest, dropping only 250 units to 25,250 on the Ford-Mercury line, and losing no ground at all in the Lincoln-Zephyr division where 750 cars were produced. Chevrolet dropped from 25,000 to 23,000, in the third consecutive week of decline, and was a factor in General Motors' reduction from 42,155 to 39,480. Plymouth suffered a decline to 12,700 from the previous week's 13,060, the highest point attained by that plant in the last year. Total Chrysler output was down, but only slightly, from 27,535 to 26,965.



Source: U.S. Dept. of Commerce
(1929-'31=100)

All-Time January Record

It has been established now that January production set an all-time high record for the month, surpassing the record which was established in January, 1929. According to Ward's figure, the month just concluded accounted for 465,000 units, an increase of 108,050, or 30 per cent over the total for the same month in 1939. The previous record, in 1929, was 422,538.

One of the most reliable early guides to the course which the auto industry might follow in early spring is the "budget" which Ford Motor Co. released Jan. 25. It set the cumulative total of 1940 Fords, Mercury's, commercial cars and trucks at 650,000 by May 1. Records show so far the production of 425,100 units, leaving 224,900 still to be manufactured prior to May 1, as the schedule now stands. This is generally regarded as a conservative estimate because production in the same period last spring totaled 227,900 units.

The same budget sets the Lincoln-Zephyr schedule for 20,000 units, of which 12,115 already have rolled off the assembly line. This leaves 7885 to be completed in February, March and April, a nice increase over the 6580 that were built in the corresponding period last year.

By March, production of the Ford tractor is expected to be 400 units a day, with a total of 27,300 tractors scheduled for completion by May 1. This tremendous output is anticipatory of a rousing reception in the farm areas because the tractor has just been formally announced to prospective customers.

Briggs May Build Aviation Motor

It is indicated that Briggs Mfg. Co. is making a thorough effort to find new business to take the place of the auto body business which the vicissi-

ACCURACY

. . . brought it home to Johnny

ALONG about the turn of the century, advertisements proudly proclaimed, "Mr. Edison has perfected the phonograph . . . it reproduces the human voice . . . JUST AS LOUD . . . the price is $125." Today, any youngster can own a much better machine for $12.50. Accuracy makes the difference. Precision manufacture—high-speed production to tolerances of ten-thousandths of an inch—has given the world new standards of health, safety, comfort, convenience . . . even culture. Better living has become a reality for millions.

For eighty years, accuracy has been the outstanding characteristic at Pratt & Whitney. Francis A. Pratt and Amos Whitney believed that through accuracy the world could be made free from drudgery, rich in the joy of living. Time has proved them right. Today, over 2000 skilled Pratt & Whitney craftsmen work to broaden the realization of this dream. The accuracy of Pratt & Whitney machine tools, small tools, and gages reflects their ability. Investigate Pratt & Whitney precision equipment. . . . It pays dividends.

PRATT & WHITNEY

Division **Niles-Bement-Pond Company · Hartford, Connecticut, U. S. A.**

tudes of the industry have taken away from it. Its latest venture is the undertaking to produce a sample aviation motor under contract to the government. Announcement of this, and accompanying plans to tool up in an eight-month period for engine production, should an order be forthcoming, has taken the industry by surprise because Briggs will be definitely leaving its previous field of activity. However, in the past it has done some engine development work. The industry recalls particularly a small engine for a rear-drive automobile.

In recent years, Briggs' search for new products has resulted in its successful introduction of a line of pressed steel bathtubs and plumbing ware. After also seeking affiliation with a manufacturer of automobile moldings, Briggs started such a division itself in a new plant northeast of the city. It is also said to be a very strong contender for Nash body work.

Mention of Nash again recalls the fact that it is no secret that experimental models of the proposed light Nash have been assembled in a brick garage on a quiet side street in Waukegan, Ill. Introduction late in the 1940 model season, possibly July, is anticipated.

Packard, too, has revised and enlivened its light car program but, unless undercover preparations have been more thorough than can be learned, the little Packard will hardly make an appearance before next fall. Rumor in connection with this job has it that Packard will break away from its traditional lines.

Needless to say, Packard's introduction of air conditioning—heating, ventilating *and* cooling—has steered other producers to a more serious consideration of equipment for similar air conditioning installations. One major producer of automobiles has its research department actively engaged on such a program and it is believed possible that some detailed information may soon be available.

New Development in Bearings

The art of bearing-making has undergone important strides in recent months, with the result that engineers at the recent national meeting of the Society of Automotive Engineers got their first peek at some new engine bearings which offer greatly improved performance and longer life. The bearings were introduced by Cleveland Graphite Bronze Bushing Co. and bear the name micro-bearing. These bearings consist of very thin babbitt on a backing of steel. The babbitt is 0.0025 to 0.005-in. maximum thickness, compared with the conventional babbitt which has been used in thicknesses of 1/64 to 0.040 in. Several exhaustive (breakdown) tests at various plants on dynamometers and water-brakes have run from 100 to 300 hr. The results, it is reported, show that the life of a bearing has been materially increased, in some cases as much as 400 per cent.

Behind the announcement of this new bearing is a development program which has been watched with considerable interest because of its possible influence on automobile engine development. The new bi-metal thin babbitt bearing is a direct outgrowth of the tri-metal bearing which was introduced 18 or 20 months ago. The tri-metal bearing, which showed a great improvement in performance over previous bearings, had steel, copper-lead and thin babbitt layers. However, a cost objection existed in automobile plants. This bearing was followed by a thin babbitt bearing backed up with brass, which is now in production use on some cars. Now the steel-backed bearing, which has improved performance at lower cost than the tri-metal bearing, has been introduced and the Cleveland plant is being tooled up for its production.

Metallurgical improvements of an unrevealed nature are accredited with part of the gain, but the use of closer tolerances and precision equipment on a scale not possible less than two years ago is said to be mainly responsible.

Graham-Paige to Resume

Early in March, Graham-Paige expects to resume assembling automobiles, including both its own models and the Hupp Skylark models. A loan or $2,000,000 and a $500,000 revolving fund commitment from the RFC, plus an additional $300,000 obtained from the private sale of convertible notes, are now available to the corporation. Graham also has been given a private commitment for $150,000 which will be used to complete the tools and dies for the manufacturer of a "Clipper" and "Hollywood" series to supplement its regular lines.

NLRB hearings on the union plant

THE BULL OF THE WOODS — BY J. R. WILLIAMS

YOU'LL NEVER GET FAR THAT WAY, YOUNG FELLER--PLAYBOYIN' ALL NIGHT, THEN LATE FOR WORK AND DOPEY ALL DAY....NOW IS TH' TIME TO BUILD YOUR FUTURE SO YOU'LL HAVE MONEY AND LEISURE TO ENJOY THE BEST PART OF YOUR LIFE
WHY DO TH' BIG BOYS SAY SUCH THINGS? HE HASN'T TAKEN A DAY OFF FER YEARS AN' YEARS!
WELL, HE AIN'T MADE HIS FIRST MILLION YET--GIVE THE OL' MAN TIME!
NO, I THINK IT'S HIS SECOND MILLION HE'S AFTER NOW--OR IS IT HIS THIRD?
J.R.WILLIAMS
T. M. REG. U. S. PAT. OFF.
THE RAINBOW'S END
COPR. 1940 BY NEA SERVICE, INC.
2-2

elections in General Motors were terminated abruptly last week when the UAW-CIO, UAW-AFL and two AFL craft unions produced a stipulation by which they agreed to permit elections on an industrial union basis between the CIO and AFL in 62 plants and would permit craft elections in 13 plants. Intervening unions which did not sign the stipulation were the Mechanics Educational Society of America, the United Aircraft Engine Workers of America and the Christian Labor Association. It was explained that they were not involved in jurisdictional disputes and that their claims could be made in separate hearings. General Motors, studying the proposal, has not yet indicated its decision on accepting the plan, but is generally expected to accede.

Steel Payroll Last Year Second Highest in Decade

PAYROLLS of the steel industry reached a total of $812,775,000 in 1939, the highest annual steel payroll but one since 1929, according to the American Iron and Steel Institute. The total for 1939 was nearly one-third more than the 1938 payrolls of $613,199,000 and was within 20 per cent of the 1937 peak payrolls of $976,083,000.

An average of 483,000 steel employees were at work in 1939, compared with 443,000 in 1938 and 572,000 in 1937. An average of 563,000 employees were at work in December, as against 561,000 in November and 449,000 in December, 1938.

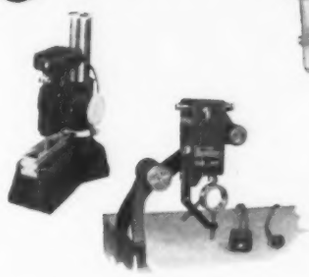
Payrolls of the industry in December totaled $84,537,000, slightly below November payrolls of $86,682,000 because of holidays and the somewhat lower rate of operations. Steel payrolls in December, 1938, amounted to $59,254,000.

Wage-earning employees in the industry earned an average of 85c. an hour in December, compared with 84.7c. in November and 83.5c. in December, 1938. Number of hours worked weekly by wage earners averaged 36.9 in December as against 39.5 in November and 32.0 in December, 1938.

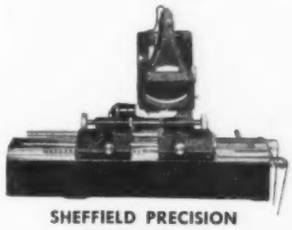
SWOC Wins Nickel Election By 636 to 407

PITTSBURGH—The SWOC has won a Labor Board election at the International Nickel Co. plant at Huntington, W. Va., by a vote of 636 to 407 for the Nickel Alloy Employees' Association.

THE *All-American* GAGE



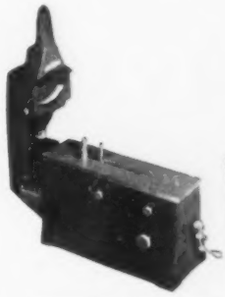
SHEFFIELD ELECTRIC GAGE



SHEFFIELD PRECISION THREAD LEAD CHECKING MACHINE

SHEFFIELD VISUAL GAGE

SHEFFIELD TAPER CHECKING MACHINE



SHEFFIELD UNIVERSAL INTERNAL MEASURING MACHINE

ALL Sheffield Gages are made right here in the United States by American workmen and from American materials. Their manufacture is in no way dependent on the fortunes of foreign wars or the difficulties of high seas transportation.

And they have proven their unmatched accuracy, durability and gaging speed in American industries and laboratories.

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NITRIGAGES

THIS WEEK IN WASHINGTON

. . . New Deal "doctors of economics," after long diagnosis, still doubtful about steel industry . . . Court decisions prove fairness of NLRB, Madden testifies . . . Arnold points to profit (fines) of anti-trust division.

o o o

By L. W. MOFFETT
The Iron Age

o o o

WASHINGTON—Now that the most thorough diagnosis ever made of the steel industry has been submitted to the Government doctors, the question arises whether they will operate and, if so, whether it will be a major or minor operation. Probably the answer is that the doctors themselves do not know what they will do. The difficulty is that they do not agree. Both on the Temporary National Economic Committee and on the staffs of government agencies are different schools of thought. There are the so-called liberals who affect to think steel and other mass industries reflect too much concentration of economic power and should be broken into smaller units, though none seems to know to just what size they should be pared. Others would have the government, labor and consumers sit on boards of directors and "advise" on policy. Then, too, the suggestion has been made that the steel industry be streamlined after the fashion of agriculture under the AAA for crop production control and price "parity" levels for agriculture and steel be manipulated. The proposal was projected if steel prices were reduced in one big slash demand would sharply increase.

Steel Survey Challenged

The careful survey by the United States Steel Corp. to show the fallacy of this view of government economic advisers was strongly challenged, though the general impression was that the challenge was more notable for its ardor than its logic. Still another government suggestion, cherished by some of the advisers, and one which they are strongly urging, came from Prof. M. G. de Chazeau of the University of Virginia, to which he has returned after his service with the Department of Justice.

Dr. de Chazeau proposed the establishment of a permanent Federal agency to collect price, sales, costs and investment information from basic industries. The purpose, he said, would be to devise "criteria of desirable and possible price changes" and to coordinate the work with other governmental agencies concerned with public utility investment schedules and central banking policy. Senator King, old line Democrat, implied, naturally enough, that Dr. de Chazeau was advocating bureaucratic control over industry. Dr. de Chazeau denied that that was the intention. Nevertheless different government departments, each eager to build up its power and each jealous of the other, are haggling over which should create such an agency. Harry Hopkins' more or less moribund, though vociferous, Department of Commerce, wants to set up such an agency. Already it has established such an agency as nearly as it can in the absence of legislation. At the same time the crotchety Federal Trade Commission, bitter foe of the steel industry, wants such an agency, sometimes euphoniously called a Bureau of Industrial Economics. Similar ambitions are nursed by the Department of Justice, whose new head, Robert H. Jackson, enjoys nothing more than tearing the hide off of big business and the mythical 60 familie. .

Zealous Economists

There are many additional government operations and treatments which have been proposed for steel and other big industries, some inspired entirely by political and jobholding motives and others the brain children of theoretical zealots who call themselves economists.

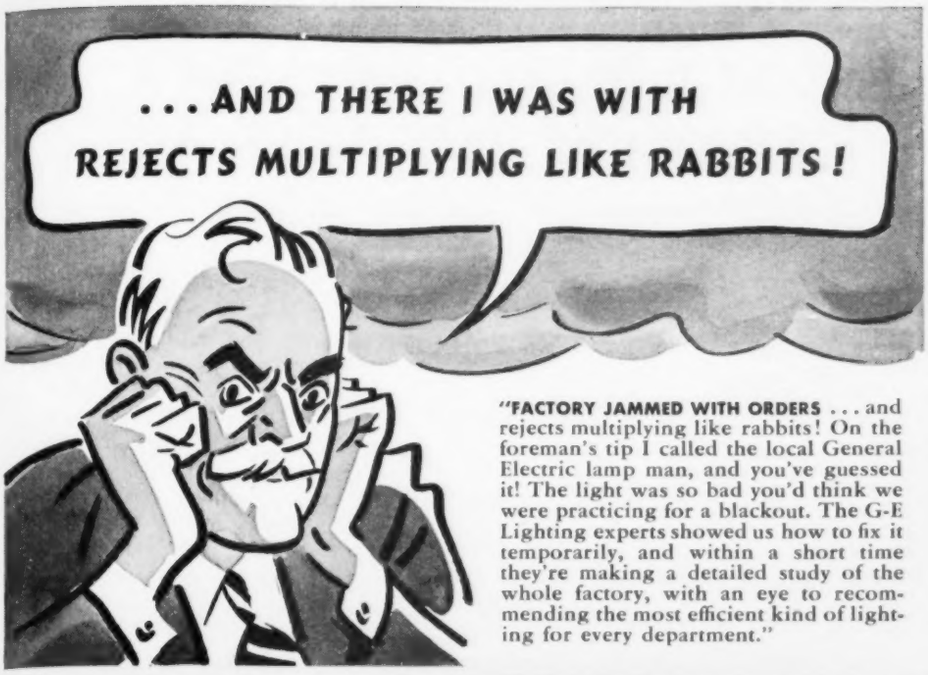
Finally and inevitably, the FTC, unable to suppress its phobia, broke out again, tiresomely and spitefully on the ancient subject of the basing point and wound up by suggesting the same old pill, a Congressional "mandate" prohibiting the basing point system. The commission representatives, in their needling of witnesses on petty matters, plainly were greatly irritated with the progress or lack of progress they were making. They were flying alone. The committee members, whose number was reduced to two at times, showed impatience with the dreary proceedings of the Commission representatives and the latter, in turn, finding they were soloing in their tirade against the basing point system, clearly showed their displeasure at the Department of Justice report on prices and distribution, chiefly perhaps because it drew no conclusion against the basing point system. While it neither approved nor condemned the system, there were points in the Department which factually, rather than by discussion, challenged the FTC f.o.b. mill position. For one thing the department report showed that the much criticised cross-hauling was almost negligible.

Final Fling by FTC

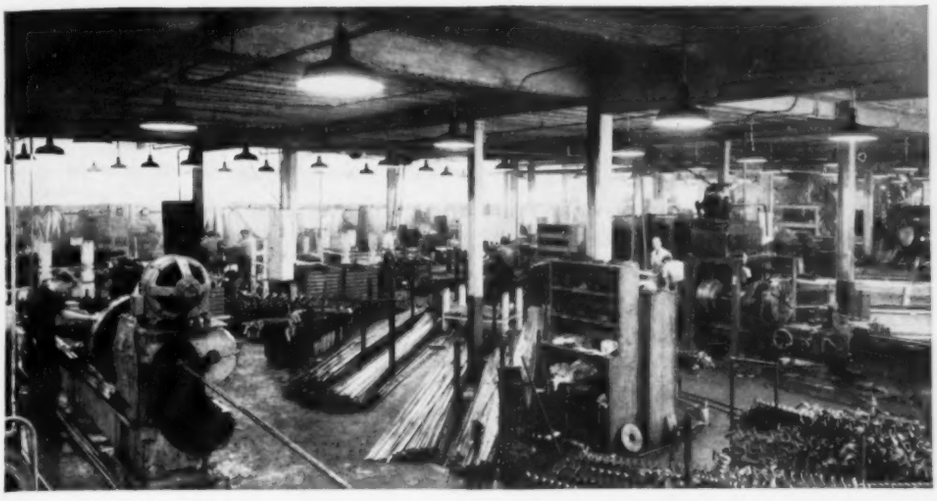
In any case it is seriously doubted that, whatever its voluminous findings may be, the TNEC will recommend abolition of the multiple basing point system but rather will realize from the convincing case presented by the United States Steel Corp. that it most definitely is a competitive system. If the hearing just ended actually marked the final fling by the FTC at the basing point system, as claimed, though doubted by many, then it looks as though it has lost a 16-year battle.

Likewise it is doubted that there will be other than general reference to the subject in material to be given to the TNEC by its advisers. This material will be in the form of monographs, to be submitted by June 1, it is understood. It is believed that one monograph or at least an important section of it will deal with a discussion on the economics of the steel industry. As to what, if any, operation the doctors may propose is a question. There will also be monographs prepared by representatives of Congressional members of the committee and of business.

Meanwhile the six executive

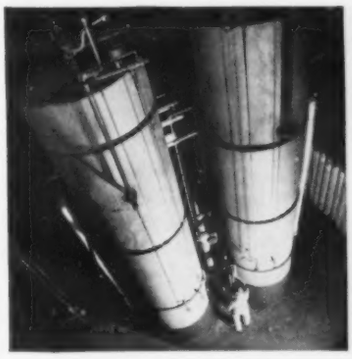


"FACTORY JAMMED WITH ORDERS . . . and rejects multiplying like rabbits! On the foreman's tip I called the local General Electric lamp man, and you've guessed it! The light was so bad you'd think we were practicing for a blackout. The G-E Lighting experts showed us how to fix it temporarily, and within a short time they're making a detailed study of the whole factory, with an eye to recommending the most efficient kind of lighting for every department."



WITH GOOD GENERAL LIGHTING in a plant, machines and benches can be arranged or rearranged for the most efficient plant operation. The above photo shows a good lighting installation in the plant of the Iron Fireman Manufacturing Co., Cleveland. This plant uses 300 watt G-E MAZDA lamps in RLM dome reflectors, spaced on 11-foot centers, to provide good light for safe seeing and more efficient work. Use the new, brighter G-E MAZDA lamps in your plant.

304° BELOW ZERO . . . The two tanks shown here contain argon, the inert gas used to help make incandescent G-E MAZDA lamps stay brighter longer. The drier the argon, the more efficient the lamp. Moisture in the argon is frozen out with liquid air at a temperature of -304° F. This year's G-E MAZDA lamps give more light because they contain a higher percentage of this drier argon. This process is only one link in the chain of General Electric research and development that is making each year's G-E lamps give more light for the current consumed. General Electric Company, Dept. 166-IA-B, Nela Park, Cleveland, Ohio.



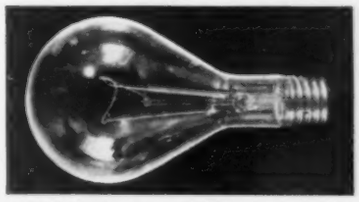
G-E MAZDA LAMPS

GENERAL ELECTRIC

Made to stay brighter longer

G.E. MAKES 9000 DIFFERENT LAMPS *for every* LIGHTING PURPOSE

Whether you make waste baskets or silk hose, G.E. is the place to go for help on making your lighting a real aid to production. Because G.E. makes more than 9000 different types and sizes of lamps, our lighting experts can give you an unbiased recommendation on exactly which ones you need and where.



G-E MAZDA lamps fulfill most industrial requirements for general lighting service. They are made in sizes from 15 up to 1500 watts.

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branches which are represented on the TNEC are said to be about ready to start their volume of these reports on the hearings with probably every shade of economic view expressed. One purpose will be to impress Congress, as justification for appropriations of $1,020,000 to the TNEC. Some reports in all probability will seek to reflect the blessings, if any, that will come from planned economy if it is only effectuated. It is quite conceivable that Congress will not be as much impressed as the authors of the reports hope.

Will Congressmen Read It?

It may be questioned if any more than a small percentage of the Congressional membership will even read the reports. That does not, however, dispose of the fact that the reports both by executive agencies and Congressional committeemen may have legislative influence. They may, for one thing, make ballyhoo for such measures as the federal licensing bill, which still is being warmly espoused by Senator O'Mahoney, Democrat of Wyoming, and chairman of the TNEC. Also these reports, which undoubtedly will be circulated throughout libraries and universities of the country, if not in grade schools, may have a bearing in the direction of influencing economic thought. It is not known how many reports there will be. It is certain there will be many of them. It is understood that the Federal Trade Commission alone will issue 17 such reports.

Wage-Hour Division Ordered Reorganized

WASHINGTON—Col. Philip B. Fleming, executive director of the Labor Department's wage-hour division, has ordered a complete revamping of the agency's cooperation and inspection divisions to eliminate "red tape" and lost motion. The changes went into effect Feb. 5.

Specifically, the order gives more authority to regional directors in the interest of speeding enforcement. The former practice required that the recommendations of a regional director be approved by Washington before a case could be closed.

This practice will continue to a limited degree under the revamping order but hereafter directors in the field will be permitted to close cases involving restitutions of less than $50,000.

Court Rulings Prove Fairness Of NLRB, Madden Testifies

WASHINGTON—The Circuit Court of Appeals decision in the Inland Steel Co. case, in which the National Labor Relations Board was described as "exercising the multiple duties of prosecutor, judge, jury and executioner," brought an emphatic denial from Board Chairman J. Warren Madden last week when he appeared before the special House committee investigating the NLRB. In defending the labor board's activities brought under the committee's spotlight during the last six weeks, Mr. Madden said:

"We have no authority to enforce our orders. We must go into the Circuit Court for an order enforcing our rulings. . . . I think the court decisions will show the fairness of our field officers."

The NLRB chairman also sought to impress the committee with the labor board's record in court cases—a record which he said shows that board rulings have been upheld in 72 per cent of the cases appealed. The witness compared the board's record with those of the Federal Trade Commission, which had 50 per cent of its decisions approved by the courts, and the Interstate Commerce Commission, with 60 per cent, according to Mr. Madden's figures placed in evidence.

Madden Criticizes Leiserson

A memorandum written by Board Member William M. Leiserson, in which he attacked Nathan Witt, NLRB secretary and revealed an effort to have him dismissed from office, was one of the sensations of the opening days of the committee's hearings in December. Mr. Madden strongly defended the secretary's competency, characterizing Dr. Leiserson's statements as "extreme," "intemperate," and "completely unsupported."

That there is an internal feud within the board itself of greater proportions than was indicated when Dr. Leiserson first appeared before the committee in December became increasingly apparent as Mr. Madden continued his testimony. Leiserson's refusal to participate in certain decisions because preliminary consideration had begun before his appointment "very seriously inconvenienced the board," Mr. Madden told the committee. He complained that the attitude of Dr. Leiserson, who is recognized as having been named to the board as "trouble shooter," has been "outrageous."

Not "Stupid Nonsense"

The ire of Mr. Madden also was aroused by another Leiserson memorandum introduced in the record in which the newest board member described as "stupid nonsense" some proposed board rules drawn up by NLRB General Counsel Charles Fahy. With Mr. Fahy sitting just across the table, Chairman Madden told the committee that "anyone who would say such a thing about data submitted by our general counsel is guilty of making reckless and intemperate statements."

Lloyd E. Garrison, dean of the Wisconsin University Law School and former chairman of the National Labor Board which functioned under the NRA, suggested that the law be amended so that the labor board would be permitted to act in representation cases only when those groups could agree among themselves on an election formula. This proposal, under which the labor board would lose some of its present powers and insulate itself from the current AFL-CIO controversy, was described by Chairman Madden as offering a "Pontius Pilate solution of the board's washing its hand of such cases."

After Mr. Madden called the Garrison proposal "sounder" than any of the other proposed Wagner Act amendments, Committee Chairman Howard W. Smith observed that under the plan warring labor factions would "stew in their own grease."

"He (Garrison) was perfectly right in saying this is not a problem for the courts; that they would only complicate it," said Mr. Madden. "His suggestion deserves the careful attention and consideration of this committee. The reaction of labor groups to this proposal should be followed with interest. It may admit the solution which Congress would want to adopt."

Claims Ford Stands Alone

While Mr. Madden was vigorously defending the NLRB, another House committee listened to a CIO automobile union leader's statement that only the Ford Motor Co. in the automobile field continues to fight the Wagner Act. Conducting hearings on measures to revise the labor relations law, the House Labor Committee was told by R. J. Thomas, a representative of

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2. Savings up to 40% in current consumption.
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5. Accurate voltage regulation in fine increments with machine running.
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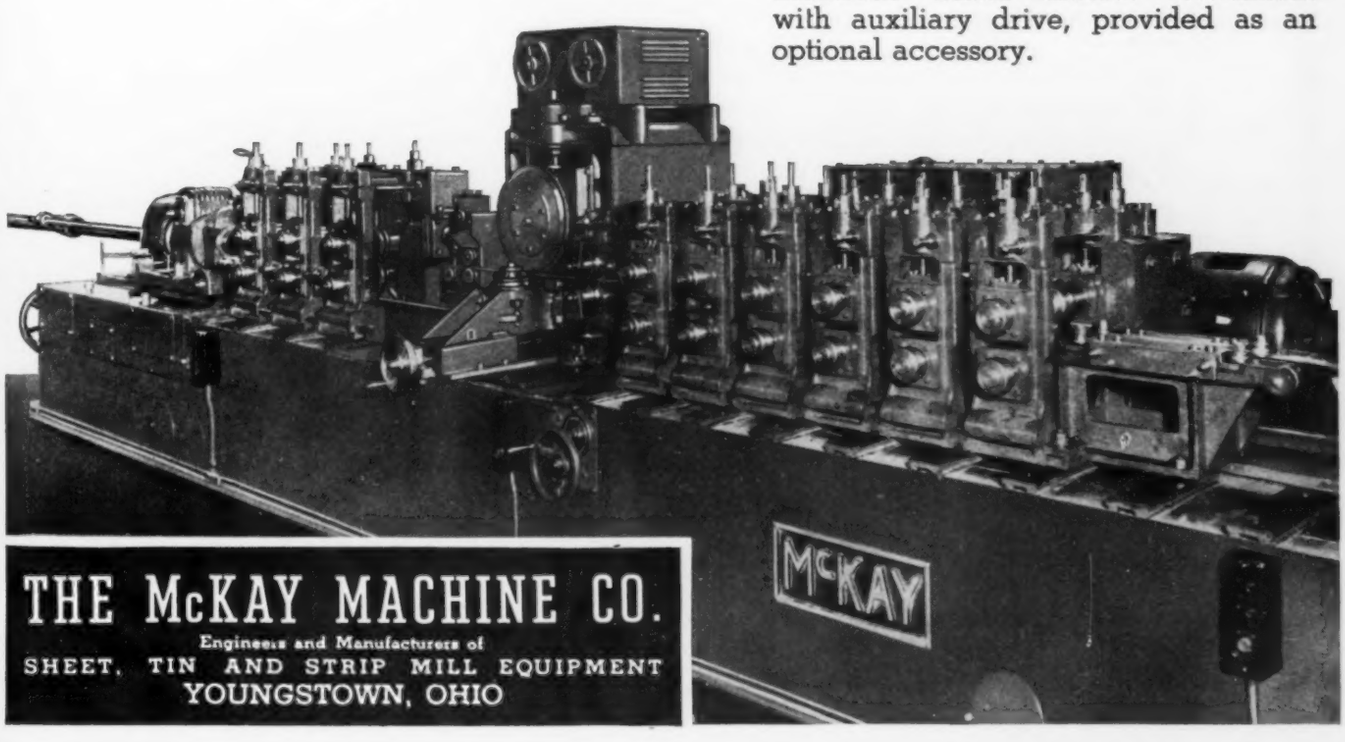
(f) Speed, heat and pressure controls grouped on front of machine for maximum convenience of operator.

Electrode wheel dresser attachment with auxiliary drive, provided as an optional accessory.



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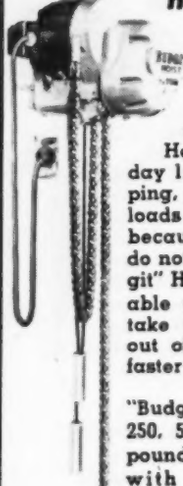

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Hang Up, Plug In, USE!

the CIO's National Automobile Workers Union, that the automobile industry might have been thrown into chaos in 1939 but for the machinery provided in the Wagner Act.

"Is it any wonder, then," he asked, "that among open critics of the Wagner Act we no longer hear the voices of the automobile corporations except, always, that incorrigible union hater, Henry Ford?"

Referring to the investigation of the special House committee, which has made headlines since it started its inquiry, Mr. Thomas informed the committee that he had been advised by "first hand sources" that most of the automobile companies "do not want the Smith committee staging any of its fishing expeditions at hearings in Detroit."

The special House committee investigating the NLRB is headed by Representative Howard W. Smith, anti-New Deal Democrat of Virginia and outspoken Congressional critic of the labor board.

December Steel Exports Rise 18.4%

WASHINGTON — Figures released by the Department of Commerce this week showed that iron and steel exports, exclusive of scrap, for last December totaled 394,035 gross tons as compared with the November figure of 332,899, an increase of 18.4 per cent. The December, 1938, total was 166,404 tons. December, 1939, shipments of 72,657 tons to Europe, 91,579 tons to North and Central America and the West Indies represented a decline under the November figures but exports of 109,455 tons to South America, 107,767 tons to the Far East and 12,577 tons to Africa reflected increases over the November totals.

Principal product exported during the month was tin plate, of which 6148 tons went to Brazil, 5339 tons to Argentina, and 4020 tons to Canada, making a total of 57,675 tons for the month after including exports to the Philippine Islands, the Netherlands Indies, the Union of South Africa and other countries.

Non-alloy ingots aggregating 47,995 tons was the second important item in point of tonnage, with 27,993 tons going to Japan, and 17,348 tons to the United Kingdom. Non-alloy black steel sheets totaled 26,432 tons, of which 8255 tons went to Canada, 2726 tons to Argentina, and 2682 tons to Mexico. The 26,237-ton trade in non-

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Write for Bulletin WP-19.

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alloy "other" plates included exports of 3615 tons to the Netherlands, 3373 tons to Canada, 2952 tons to Argentina and 2930 tons to Sweden.

Far East Takes Less

The department said that of the five major geographical areas to which exports move, only the Far East took less United States steel in 1939 than in 1938, decreasing from 866,691 to 645,660 tons. Largely because of increased shipments to the Netherlands and Sweden, the trade with Europe increased from 434,492 tons to 597,154 tons. The trade with North and Central America and the West Indies increased by nearly one-half, rising from 450,832 to 658,982 tons. South America bought 503,818 tons against 318,539 tons in 1938, while the trade with Africa climbed to 93,388 tons as contrasted with 78,694 tons in 1938. The year's total was 2,499,002 tons compared with 2,149,249 tons in 1938.

December scrap exports, reaching their lowest monthly level since September, 1938, totaled 206,402 gross tons as compared with 272,656 tons in November. Scrap exports for 1939, however, totaled 3,577,427 tons as compared with 2,998,757 tons the preceding year, an increase of 19.3 per cent. The 1939 trade nevertheless fell far short—12.6 per cent—of the 1937 total of 4,092,590 tons.

Of the scrap exported in December, 124,216 tons went to Japan, 30,039 tons to Italy, 19,350 tons to the United Kingdom, and 12,054 tons to Canada.

Argentine Authorizes $2,800,000 for Railroads

WASHINGTON — The government of Argentina has authorized the expenditure of an additional $2,800,000 for railroad right-of-way improvements, of which $1,173,230 has been allocated for line repairs, fixed installations and equipment; $360,000 for the Parana-Rio Grande line, and $230,000 for the reconstruction of the Transandine Railway.

Manganese Bids Are Rejected by Government

WASHINGTON—Bids submitted on Dec. 19 for 2000 to 45,000 tons of 48 per cent manganese ore have been rejected by the Government, and the Procurement Division, Treasury Department, has readvertised for new bids, to be opened on Feb. 20. It is reported that the Government rejected the original bids on the claim that they were too high.

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Guides you in making a complete check of your plant from roof to basement . . . tells where to look for waste in power production and in building maintenance . . . how to stop this waste. This book should be on the desk of every factory executive. It is yours for the asking. Send for your copy today.

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ICC Finds Further Basing Point Revision Injurious to Pittsburgh

WASHINGTON—While the Federal Trade Commission was denouncing the basing point system in the steel industry and praising its proposed f.o.b. mill pricing substitute at hearings before the Temporary National Economic Committee recently, the Interstate Commerce Commission released a report in which it said that "if further efforts to modify or uproot the basing point system should be successful, the market for Pittsburgh and Youngstown steel might suffer further restriction."

Reference to the basing point system was made in the ICC report on the proposed Ohio River-Great Lakes Canal and was one of the considerations weighed by the commission in attempting to appraise traffic possibilities on the projected waterway. On the basing point, the commission said:

"Such (location) advantages or disadvantages are also affected by the pricing or selling system used in the (steel) industry. Pittsburgh and Youngstown are situated in one of the most highly industrial sections of the country and are within trucking distance of important steel-using points. The substitution of the multiple basing-point price system for 'Pittsburgh-plus' price system may well account, however, in part for the relative decline of Youngstown and Pittsburgh. In fact, the relative decline of these areas would probably have been greater but for the use of the basing point system.

Further Restriction

"Steel companies with plants which have derived important advantages from this system generally oppose any further abandonment of it. Nevertheless, the number of basing points has again been increased within the last year or so. What the future may hold in regard to this matter is, of course, not known, but if further efforts to modify or uproot the basing point system should be successful, the market for Pittsburgh and Youngstown steel might suffer further restriction resulting from the necessity of selling finished steel at or more nearly at mill price plus transportation."

After making a general analysis of rail transportation costs on traffic that would be affected by the proposed project, giving consideration to the future of steel production, the trend toward a greater number of basing points, and the outlook for future ore and scrap shipments, the Interstate Commerce Commission reported to President Roosevelt that the projected $240,000,000 Beaver - Mahoning canal would mean a gross revenue loss of $35,000,000 or more to the railroads—a loss which the commission said might so weaken the rail carriers as to prevent them from meeting the needs of the public for efficient and safe transportation.

The report, submitted at the request of Mr. Roosevelt after the Army Board of Engineers for Rivers and Harbors, found that the project would be unjustified if the railroads would permanently reduce their rates by an average of 29c. per ton, and said that "such reductions could not be economically justified for the reason that on the information now available these reductions could not be confined to the

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traffic of those who would be expected immediately and directly to benefit by the construction of the proposed waterway."

December Machine Tool Exports Up 30%

WASHINGTON — Machine tool exports for December reached the record monthly figure of $12,821,234, a 30 per cent increase over the December 1938 shipments, the Machinery Division of the Department of Commerce reports. Total 1939 machine tool shipments abroad, representing the highest annual foreign sales ever recorded, were valued at $112,571,552, a 16 per cent increase over the previous peak figure of $97,270,616 recorded for 1938.

Outstanding increases in the December, 1939, exports of power-driven metal-working equipment were recorded for lathes, valued at $1,904,390; against $904,511 for December, 1938; vertical boring mills and chucking machines, $770,439 from $335,598; thread-cutting and automatic screw machines, $801,006 from $473,073; knee and column type milling machines, $717,412 from $269,346; gear cutters, $466,327 from $269,832; external cylindrical grinders, $424,175 from $287,885; tool, cutter and universal grinding machines, $544,692 from $320,432.

Exports of metal-working machinery, other than power-driven, totaled $477,249 in December, a 44 per cent gain over the corresponding shipments valued at $330,815 in December, 1938. Exports of all industrial machinery advanced in December to a value of $29,348,769, also one of the highest monthly figures ever recorded and 21 per cent above the corresponding 1938 shipments valued at $24,210,186.

Fines Make Anti-Trust Office Profitable, Arnold Says

WASHINGTON—Fearful that Congress in the current economy wave may turn thumbs down on a requested $1,000,000 increase in appropriations for the Justice Department's anti-trust division, Assistant Attorney General Thurman Arnold is out to sell taxpayers on the idea that the Government's anti-trust activities are "not an expense but a revenue."

During the present fiscal year the anti-trust division received an appropriation of $1,300,000. For next fiscal year it asked $2,300,000. Instead of complying, the House appropriations committee pared the figure down to $1,200,000, or $100,000 below the amount appropriated for the current fiscal year. Prompted by this action, Mr. Arnold set forth these arguments:

1. From 1929 to 1936, the division spent $300,000 a year, collected fines amounting to $73,000, concerned itself with the enforcement of 31 acts.

2. Since July 1, 1939, about $700,000 out of a total appropriation of $1,300,000 has been expended, $2,400,000 in fines has been collected, with a potential source of $5,000,000 more.

"Of course, we are not running the division to collect fines," Trust Buster Arnold says in explanation. "But the difference between the two types of enforcement as a narrow budget balancing matter are strikingly illustrated by these figures. If you don't want anti-trust enforcement you can always get non-enforcement by paying lip service to the principles and cutting down appropriations, but your excuse can never be economy because the anti-trust divisions pays revenue into the Treasury instead of taking it away."

● Look beyond the purchase price when buying forgings no matter how tempting the price may appear to be. Protect yourself against the cost of machine time, labor, tool cost, power and handling involved in various finishing operations that frequently liquidate all the economies a lower purchase price promises and then go on piling up excessive costs. The difference between forgings that protect you against high production costs and forgings that cost more at the point of assembly is seldom visible, although it can be detected by gauges and instruments. Instead of struggling with prices that perplex you, check the cost records for running through a lot of forgings and consult your production executives for ways to cut cost at the point of assembly. Then ask us for proof that T & W forgings usually cost less at the point of assembly.

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Stream Pollution Aid May Be Revised

WASHINGTON—The Barkley-Vinson stream pollution control bill, under which the Federal Government would embark on a plan to aid industry and municipalities to relieve the cause of stream pollution, may be stripped of its grant-in-aid provisions and have its passage delayed by several months as a result of a White House move to keep Federal expenditures within the bounds fixed by the budget.

President Roosevelt has suggested to House and Senate sponsors of the bill that RFC loans at from 2½ to 3 per cent interest should be substituted for the direct Treasury loans provided for in the original bill and that provisions for Federal grants be eliminated completely from the measure. Chairman Mansfield of the House Rivers and Harbors Committee has asked the Reconstruction Finance Corp. and the U. S. Public Health Service, the administrative agency designated by the bill, to report on the changes projected by Mr. Roosevelt.

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U. S. Navy Contracts

WASHINGTON—The Navy Department's Bureau of Supplies and Accounts has awarded contracts to these companies:

Electro Refractories & Alloys Corp., Buffalo, crucibles, $12,367; Joseph T. Ryerson & Son, Inc., Chicago, structural steel, $11,760; Caswell, Strauss & Co., Inc., New York City, pig tin, $95,792; Bethlehem Steel Co., Bethlehem, Pa., steel, $27,889; Republic Steel Corp., Cleveland, steel plates, $7,122; Central Iron & Steel Co., Harrisburg, Pa., steel plates, $76,429; Stanley Works, Bridgeport, Conn., cold rolled steel, $6,570; Allegheny Ludlum Steel Corp., Brackenridge, Pa., corrosion-resisting steel, $8,206; Brown & Sharpe Mfg. Co., Providence, R. I., milling machine, $7,258.

Electric Auto-Lite Co., Toledo, engine gage units, $12,670; Allegheny Ludlum Steel Corp., Brackenridge, Pa., corrosion-resisting steel, $8,698; Union Tool Co., Orange, Mass., calipers, gages, dividers and squares, $6,293; The L. S. Starrett Co., Athol, Mass., calipers, gages and dividers, $6,201; Millers Falls Co., Greenfield, Mass., calipers, gages, planes, $7,197.

Carnegie-Illinois Steel Corp., Washington, D. C., bar steel, $11,247; Warner & Swasey Co., Cleveland, turret lathes, $7,838; Habirshaw Cable & Wire Division, Phelps Dodge Copper Products Corp., New York City, wire, $11,730; John A. Roebling's Sons Co., Trenton, N. J., wire cloth, $15,174; Carborundum Co., Niagara Falls, N. Y., abrasive cloth, $19,757; American Chain & Cable Co., Inc., Page Steel & Wire Division, Monessen, Pa., welding electrodes, $16,575; General Electric Co., Schenectady, N. Y., double reduction gears, $38,433; South Bend Lathe Works, South Bend, Ind., lathes, $29,792; R. K. LeBlond Machine Tool Co., Cincinnati, $48,500.

The following contracts for cables have been awarded: National Electrical Products Corp., Pittsburgh, $33,292; The Okonite Co., Passaic, N. J., $32,984; Collyer Insulated Wire Co., $32,307; Habirshaw Cable & Wire Division, Phelps Dodge Copper Products Corp., New York City, $31,980; Anaconda Wire & Cable Co., $32,627; and the Rockbestos Products Corp., $74,722.

Government Awards

WASHINGTON — Government contracts for iron and steel products, as reported by the Labor Department's Public Contracts Division for the week ended Jan. 27, totaled $433,867. For non-ferrous metals and alloys, contracts aggregated $348,016, and for machinery, $356,412. Details follow:

Iron and Steel Products

Bethlehem Steel Co., Bethlehem, Pa., War Ordnance, steel forgings	$162,634
Crucible Steel Co. of America, New York City, War Ordnance, steel forgings	80,868
Lansdowne Steel & Iron Co., Morton, Pa., War Ordnance, steel forgings	57,000
Barnard Aviation Equipment Co., Inc., Newark, N. J., War QMC, steel drums	17,035
Frank M. Weaver & Co., Inc., Lansdale, Pa., WPA, structural steel	11,736
Central Iron & Steel Co., Harrisburg, Pa., Norfolk Navy Yard, steel	31,670
Union Boiler & Mfg. Co., Lebanon, Pa., U. S. Coast Guard, buoys	37,450
Northern Pacific Railway Co., Seattle, Interior Alaska R. R., steel rail	10,164

Rustless Iron & Steel Corp., Baltimore, Norfolk Navy Yard, steel 14,066
Walworth Co., New York City, Navy S & A, wrenches 11,241

Non-Ferrous Metals & Alloys

Koppers Co., Baltimore, War Engineer Corps, bronze castings $14,538
Phelps Dodge Copper Products Corp., New York City, Navy Purchasing Office, brass pipe 13,126
Seth Thomas Clocks, Thomaston, Conn., War Ordnance, fuze parts .. 36,825
Westclox Division, General Time Instruments Corp., LaSalle, Ill., War Ordnance, fuze parts 46,365
International Minerals & Metals Corp., New York City, Navy S & A, copper 116,122
Federated Metals Division, American Smelting & Refining Co., New York City, Navy S & A, zinc 16,225
Mueller Brass Co., Port Huron, Mich., Navy S & A, brass 16,945
Revere Copper & Brass, Inc., Baltimore Division, Baltimore, Navy S & A, brass and copper 75,168
The Aluminum Cooking Utensil Co., New Kensington, Pa., Navy S & A, containers 12,699

Other Machinery

Ingersoll-Rand Co., Washington, D. C., Panama Canal, compressors and grinders $21,545
Caterpillar Tractor Co., Peoria, Ill., Panama Canal, tractors 76,304
Stewart Warner Corp., Chicago, Norfolk Navy Yard, engine parts 15,283
Worthington Pump & Machinery Corp., Buffalo, N. Y., TVA, air compressors 33,999
Quaker City Gear Works, Philadelphia, War Ordnance, gears 15,242
The Warner & Swasey Co., Cleveland, War Ordnance, turret lathe 21,043
Harnischfeger Corp., Milwaukee, War Ordnance, bridge crane 29,710
Austin Hastings Co., Inc., Cambridge, Mass., Navy S & A, radial drills.. 32,430
Lloyd & Arms, Inc., Philadelphia, Navy S & A, precision lathes 17,629
The Hendey Machine Co., Torrington, Conn., Navy S & A, lathes 12,057
Buffalo Forge Co., Washington, D. C., Navy S & A, ventilation equipment 39,751
Walworth Co., New York City, Navy S & A, composition and bronze valves 26,426

Supplies for Army

WASHINGTON—The War Department last week announced the award of contracts totaling $359,454 under the army's educational order program to these companies: Goodyear Tire & Rubber Co., Akron, Ohio, standard gas mask carriers, $88,167; C. H. Cowdrey Machine Works, Fitchburg, Mass., for 75 mm. Pack Howitzers, $174 208; Chrysler Corp., Detroit, fuses, $97,079.

Correction

In the final sentence of its report on the TNEC steel hearing, THE IRON AGE of Feb. 1, page 87-H, inadvertently said, speaking of B. F. Fairless, president of the United States Steel Corp., that he told the committee that the steel corporation "does rely solely" on the American Iron and Steel Institute's rate book. The sentence omitted the negative "not" and should have read to the effect that the steel corporation "does not rely solely on the book but gathers rates on its own initiative in order to keep up to date."

Clapp, Maker of Drop Forgings, Celebrates 75th Anniversary

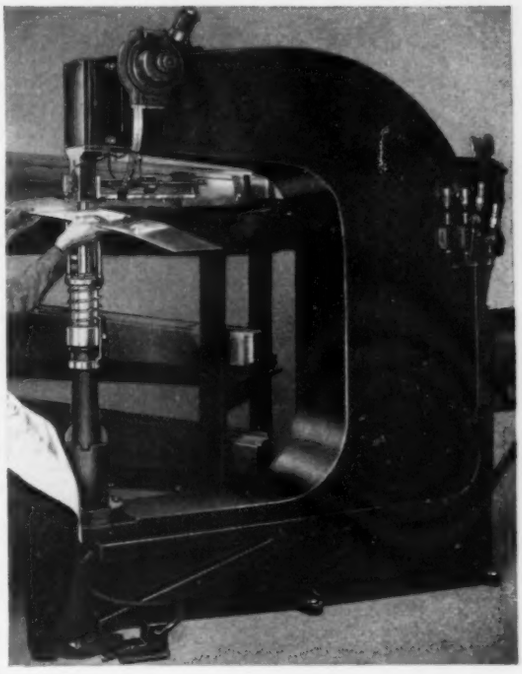
THE E. D. Clapp Mfg. Co., Auburn, N. Y., drop forging manufacturer, is this year celebrating its 75th anniversary. Founded in 1864 as E. D. Clapp & Co., by Emerous D. Clapp, it has been owned and managed by three generations of this family.

Emerous D. Clapp, who pioneered in the manufacture of the Clapp wagon, sent to England in 1854 for a so-called drop or stamping hammer to use in his wagon works at Ira, N. Y. Finding this hammer a crude tool, he and his brother-in-law, Frederick Van-Patten, redesigned and improved it

comes now---

SPEED *of control*
in **HYDRAULIC OPERATIONS**

Speed of reaction without sacrificing efficiency is now being had by pneumatically controlling hydraulic power valves. There is an important saving in reaction time of pneumatic controls over the comparatively slower hydraulic reaction in identical circuits.



T-J Pneumatic Remote Controls provide full advantage of this saving also in that their variety of unit types permit their application to your requirements to be of standardized equipment.

T-J Controls are shown here on a T-J Hydraulic Rivitor. Developed for riveting aircraft fuselage and wing sections, the operator's station is necessarily some distance from the power valve. T-J Pneumatic Controls provide the desired snappy reaction to the power valve.

Bulletin number RC-4 reports on the high points of these systems in this application type as well as in many others in which they are being successfully and increasingly used. Your copy will be sent promptly upon receipt of your request.

this is a **TOMKINS-JOHNSON** *product*

Factory at 628 N. Mechanic St., Jackson, Michigan. Agents in principal cities. T-J Products also include Air and Hydraulic Cylinders . . . Rotating Chucks and Cylinders . . . Rivitors . . . Clinchors . . . Special Equipment . . . Brownie Coolant Pumps . . . T-J Die Sinking Milling Cutters.

and then constructed a number of duplicate hammers, installing them in the Ira plant.

As a result of the introduction of the Clapp board drop hammer into his wagon plant, Mr. Clapp decided to establish a factory in Auburn, for the manufacture of all types of drop forgings for wagon, carriage, buggy and other forms of horse-drawn vehicles. This was organized and began operations in 1864 in the name of E. D. Clapp & Co., a partnership, later incorporated in July, 1876, under its present name.

Son Succeeded Founder

The founder was president until his death June 1, 1889. He was followed as president by his son, Delamer E. Clapp, who served until his death Feb. 11, 1929. E. D. Clapp, his son, succeeded as president, the position he still holds. H. W. Clapp is vice-president and Edward A. Clapp, president of the Pyrene Co. of Newark, N. J., is assistant treasurer. W. R. Steele, 25 years with the company, is secretary. J. D. Hutchinson, treasurer and Frank A. Weeks, assistant secretary.

The company is believed to be the oldest drop forging company in the country continuously owned and operated by one family.

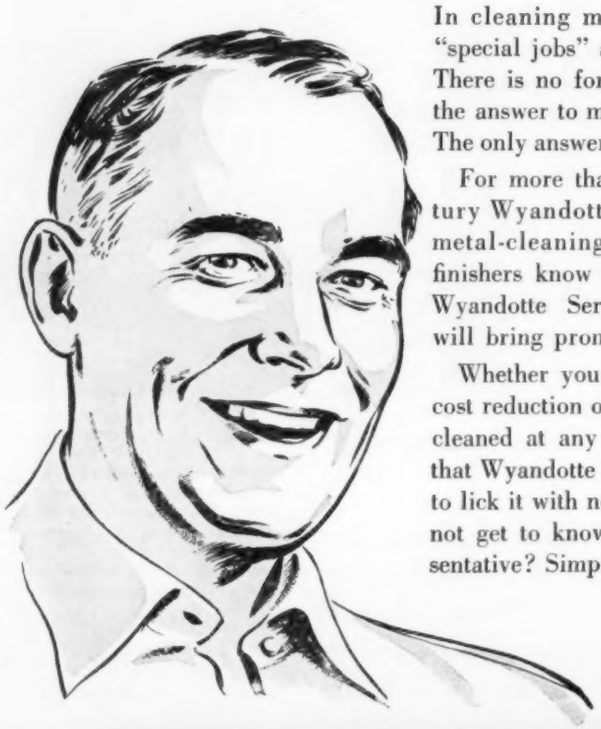
The first special forgings made by the company were musket parts for the Northern Army in the war between the states. Beginning in the early 80's, bicycle forgings were produced. In 1899 the company made its first automobile forgings and in 1916 the first airplane forgings.

It is equipped for the production of small and medium size forgings in carbon, alloy, tool, corrosion resisting and other special steels, as well as non-ferrous metals, and maintains a large machining and heat treating department for finishing its products.

I stopped experimenting years ago....

When I want a special job done, I call

WYANDOTTE!



In cleaning metal for finishing, "special jobs" are the general rule. There is no formula that will give the answer to most of the problems. The only answer is *experience.*

For more than a third of a century Wyandotte has been solving metal-cleaning problems. Metal finishers know that a call to their Wyandotte Service Representative will bring prompt action.

Whether you have a problem in cost reduction or a job that must be cleaned at any cost, you will find that Wyandotte Service Men are out to lick it with no time wasted. Why not get to know your local Representative? Simply write to—

THE J·B·FORD SALES CO·
WYANDOTTE MICHIGAN
SERVICE REPRESENTATIVES IN 88 CITIES

Milwaukee Unions Charge Discrimination

MILWAUKEE—Members of the Milwaukee Metal Trades Association were assailed by the Wisconsin Association of Independent Unions at a meeting in Milwaukee, Jan. 27. A resolution alleged discrimination in "refusing to hire employees working for another member."

According to Walter F. Cappell, chairman of the association's membership committee, and proposer of the resolution, "to obtain work from a different firm, metal trades' employees must first show lay-off slips from their previous employer. This is a violation of civil liberties and is un-American. It reduces the workers to the status of slaves," he said.

Macklin Co. Expands

JACKSON, Mich.—More than doubling floor space since it occupied its original building here in 1927, Macklin Co., manufacturer of grinding wheels, has recently completed a new addition to its building. Approximately one-fourth of the added floor space will be occupied by the production offices, laboratory and first aid department, as well as offices for the production staff. One section of the building will be used to house electric ovens used in the manufacture of resinoid grinding wheels. The addition is 280 x 42 ft.

What's New in Material Handling Apparatus

(CONCLUDED FROM PAGE 51)

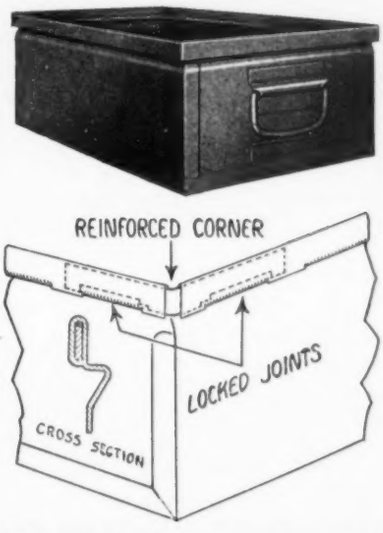
facturing plants and yards. The same 18-hp. heavy duty, medium speed tractor engine that has been used for some years in the model B farm tractor is used as the powerplant of the model 1B. It develops 13.5 hp. at the drawbar. This is a valve-in-head engine, with removable cylinder liners, and is protected by air, oil and fuel filters. Fuel consumption is said to be less than 1 gal. per hr. The engine is equipped with a muffler and a foot accelerator.

The unit has both a foot brake and individual hand brakes on the rear wheels to facilitate maneuvering in cramped quarters. There are three forward speeds and a reverse. The machine is fitted with a quick hitch or automatic coupling that can be adjusted in height. Release is by a rope pull. Numerous accessories can be attached, such as power take-off, generator, lights and wheel weights.

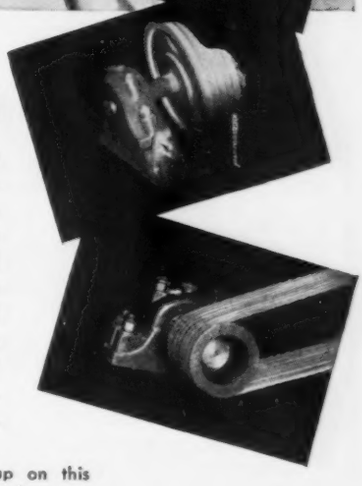
Industrial Tires

WHEELBARROWS which were put on a special type pneumatic tire some five years ago now may be equipped with a solid rubber tire of great load carrying capacity for

BINRACK stacking units for storage and assembly are built-up container units with separately removable, gravity feed, till type bins. A 12-in. hopper bin stacking unit and a 12-in. standard bin unit are shown. Single and double row rack units are also made in 8 in. lengths. The removable bins range in width from 2 to 8 in. and in capacity from ½ to 6 pints. Overall depth of rack units is 8 in. The sloping position of the bins in the racks keeps the parts in the bin-front where they are readily accessible. These units are made by the Gordon L. Hall Co., Old Lyme, Conn.



AN improved, reinforced corner is now being used on all closed and open-end stacking boxes made by Pollard Brothers Mfg. Co., 5500 Northwest Highway, Chicago. The corner reinforcement consists of a piece of high tensile strip steel clinched at each side of the corner by lock joints from the turned-over hem edge. A year of experimental tests indicates that the corner will never loosen or come apart. The company is prepared to make all sizes of stacking boxes using this new corner reinforcing angle, but carry in stock five standard sizes of both the stacking box and the open-end box.



DODGE DRIVES TEAM-UP ON THE JOB

THIS group fan drive insures dependable operation of a foundry dust collector system and has eliminated costly and bothersome maintenance . . . The bearings are Dodge-Timken Type "C" . . triple steel sealed against abrasive dust. The drives are Dodge "D-V" with "Matched Quality" Sheaves and Belts to insure true running, long life and low maintenance . . . A Dodge-Diamond "D" Clutch provides for operating fans individually when both are not required. Concrete piers provide rigid support for drives . . .

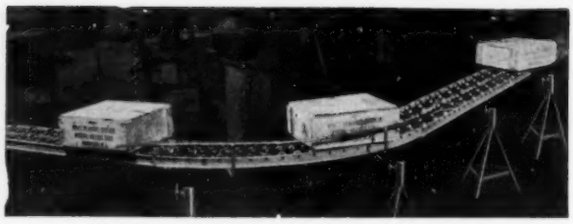
Dodge Bearings, Clutches and "D-V" Drives team-up on this job to provide free flowing and dependable power at low cost. The Dodge line is complete and includes every type of appliance necessary to insure the selection of "The Right Drive for Every Job." Specify Dodge for low-cost power transmission.

DODGE MANUFACTURING CORPORATION
MISHAWAKA, INDIANA, U. S. A.

THE Right Drive FOR EVERY JOB

Think of DODGE MISHAWAKA

. . . when planning a new plant . . . when adding a new department . . . when installing new machinery . . . when modernizing old equipment . . . when designing new products.



METZGAR wheel conveyors are light in weight (6.6 lb. per ft.), but will transport horizontally boxes, cartons and cases weighing up to 700 lb. Welded construction is used for strength and rigidity. Couplings are simple and are protected against bending. Straight lengths can be coupled at as much as a 40-deg. angle without using a curved section. Wheel bearings are in dust proof housings and require no lubrication. Regular stands have three legs as shown for lightness and stability, but a portable type of castered base may be obtained. A straight roller conveyor of the same width, 11½ in., is also furnished by the Metzgar Co., Grand Rapids, Mich. These conveyors can be set up in a few minutes and hung on the wall when not in use.

All geared 21" 24" and 28"

SUPER SERVICE UPRIGHTS

More holes per dollar!

Greater productive capacity, adaptability, reliability, accuracy, convenience and economy available in Super Service Uprights assure "More Holes per Dollar."

Cincinnati Bickford invites the most searching comparison of these modern machines with other drilling machines. We are confident your analysis will convince you that Super Service Uprights offer maximum return in production per dollar of investment. The Cincinnati Bickford Tool Co., Oakley, Cincinnati, Ohio, U.S.A.

CINCINNATI BICKFORD

operations where tires are exposed to severe abuse. *B. F. Goodrich Co.* has perfected a 16x3-in. Vulc-On tire, cured directly to the wheelbarrow wheel. Installations have been made in steel mills, foundries and automobile plants. Goodrich has also developed a so-called Nu-Seal wheelbarrow wheel, with pneumatic tire. The wheel has special bearing seals to prevent the entrance of dust and dirt and is intended for use in the ceramic industry. Still another Goodrich development is the Silvertown cushion type tire, illustrated, for light hand truck and trailer service.

Magnet Crane

A NEW magnet crane for handling pig iron and scrap has been developed by the *Harnischfeger Corp.*, Milwaukee. With its 39-in. circular magnet, and 40-ft. boom, the P&H model has a capacity of more than 1½ tons of pig iron, scrap and other metals. The crane itself exclusive of the magnet has a capacity of 5200 lb. at a 25-ft. operating radius, and as much as 9800 lb. capacity at a 15-ft. radius. Equipped with a modern magnet cable reel, and an 85-ft. tag line, the crane is driven by a 35 hp. P&H motor-generator set, which works under 220 volts, three-phase, 50-cycle current. A tail cable bracket prevents the cable from catching on or under the crawler track. To facilitate working in wet weather, the crane has a waterproof cable receptacle. The three forward speeds range from ⅝ to 2½ miles an hour. Crane is built of alloy steels and all-welded.

Hoist Controller

FOR use on electrically operated cranes and hoists, the *Electric Controller & Mfg. Co.*, 2693 E. 79th St., Cleveland, announces an a.c. dynamic braking hoist control. This new control eliminates the mechanical load brake on the crane. It may be used with any standard a.c. wound rotor hoist motor without the necessity of conversion units. When installing this new control on existing cranes, it is only necessary to disconnect the locking device that causes the mechanical load brake to operate in the lowering direction, thus permitting the motor and gearing to be free-running in both directions.

There are three major advantages of this new magnetic hoist controller —power saving, elimination of upkeep cost of mechanical load brake, and faster lowering speeds. At the

same time, the control has the ability to permit very short, accurate inching movements. Power is saved because the control allows a heavy, overhauling load to drive the motor as a generator on all points except creeping speed points, thus returning power to the line.

Hyper-synchronous speeds are obtained on the last two points of the master switch and allow the motor to run at speeds as much as 50 per cent above synchronous speed of the motor. These speeds are obtained only with overhauling loads. Such speeds are particularly well suited on magnet cranes, in which the lowering of an empty magnet may be speeded up.

Stack Bins for Assembly Parts

SEVERAL new types of containers for parts in process are illustrated. One photograph shows specially designed cabinets that serve both as delivery trucks and storage units. A modification of this scheme, not illustrated, is formed by the combination of Stackbins and Stackracks made by the *Stackbin Corp.*, 66 Troy St., Providence. Stackbins with full hopper fronts, designed for storage, production and assembly work, are stored in the stockroom in Stackracks, which are individual steel units that lock together to form storage racks of any desired shape or capacity. The Stackbins can be slid out of the Stackracks, carried to any part of the plant for removal or transfer of the contents, or any part of the contents can easily be removed from the Stackbins without disturbing the storage assembly. This arrangement eliminates the time wasting transfer of small parts and materials from one container to another.

Conveyor Belt Coating

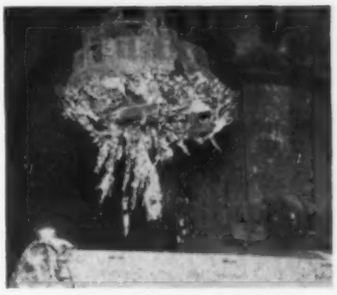
DURING long periods of idleness, conveyor belt covers may suffer greater deterioration through the effects of sunlight and air than when the belting is in use. One of the large steel companies has been studying this problem of belt deterioration and approached the *B. F. Goodrich Co.*, Akron, Ohio, for cooperation. As a result of a research program, Goodrich is now offering a new synthetic coating for belting covers, designated as Goodrich R-60-T protective coating. Samples of conveyor belting with covers under severe tension have been coated with this composition and have shown no evidence of deterioration after six months' exposure to all kinds of weather conditions, it is reported.

Comprehensive Program Planned for Tool Engineers' Annual Meeting

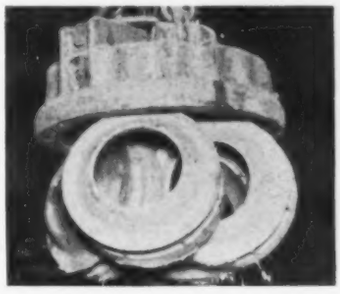
ONE of the most ambitious and comprehensive technical programs yet undertaken by the American Society of Tool Engineers is planned for the annual meeting of the society to be held in New York, March 7, 8 and 9, at the Hotel New Yorker. About 30 speakers will participate in the several symposiums planned on related topics. Preliminary arrangements have been made to accommodate about 1000 members and guests. Emphasis has been placed on the technical sessions this year, since no show is to be held in connection with the annual meeting as was the

CUT METAL HANDLING COSTS with DINGS

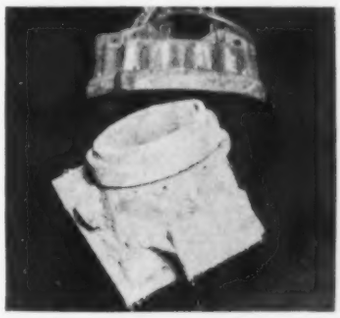
High Intensity Lifting Magnets



Dings Lifting Magnet charging tumbling barrel or mill which cleans castings—it brings a big saving in time.



Five 2000 lb. bull rings on their way to the cleaning room—an easy lift with a Dings.



A Dings Magnet easily lifts this 7000 lb. casting with only one point of contact!

YOU can move castings, scrap and other metals faster and at less cost if you use a Dings *High Intensity* Lifting Magnet. These powerful magnets are built to lift big payloads with minimum current input, built to stand up under years of tough service. Products of an organization with 40 years' experience in building nothing but magnetic equipment, they give you these advantages:

COIL CAVITY FILLED WITH COIL! — no space taken up by clamps, tighteners, etc.—more coil, more lifting power.

ANCHORED COIL—coil cannot move (a common source of magnet failure)—held by bolts in cored-out section of magnet body.

SPOOL HUB and top spool side made of steel and are part of magnet body.

LEADS protected against damage from stray scrap by steel plate.

SEALING DISC welded to body—absolutely waterproof.

CAP SCREWS holding bull rings are welded fast.

HEAVY STRUCTURAL FINS — strengthen body and dissipate heat that destroys power.

No other lifting magnet has all of these features! For lower costs, bigger profits, use a Dings! Send for catalog today. DINGS MAGNETIC SEPARATOR COMPANY, 727 Smith St., Milwaukee, Wisconsin.

Dings LIFTING MAGNETS HIGH INTENSITY

LIFTING MAGNETS • MAGNETIC CLUTCHES • SEPARATORS

case at Detroit in the two preceding years.

The first technical session, scheduled for Thursday afternoon, March 7, will be devoted to the subject of the economics of tooling and will be discussed by well-known speakers including B. G. Tang, general superintendent, Schenectady works, General Electric Co.; W. F. Stegemerten, superintendent of equipment and methods, Westinghouse Electric & Mfg. Co., South Philadelphia works; J. M. Crawford, assistant superintendent, generator and motor section, General Electric Co., Schenectady; F. E. Darling, wage standards department, Eastman Kodak Co., Rochester, N. Y.; and W. J. Peets, assistant superintendent, Singer Mfg. Co., Elizabethport, N. J.

This symposium will cover the entire scope of production planning and will describe the most successful methods of tooling large and small products in large and small quantities. Many executives have been concerned about the proper tool cost that will produce the maximum of economy in manufacturing under various conditions and this symposium is intended to develop a possible formula for arriving at an economic tool appropriation where other factors such as volume and unit price are known.

Precision Small Gears

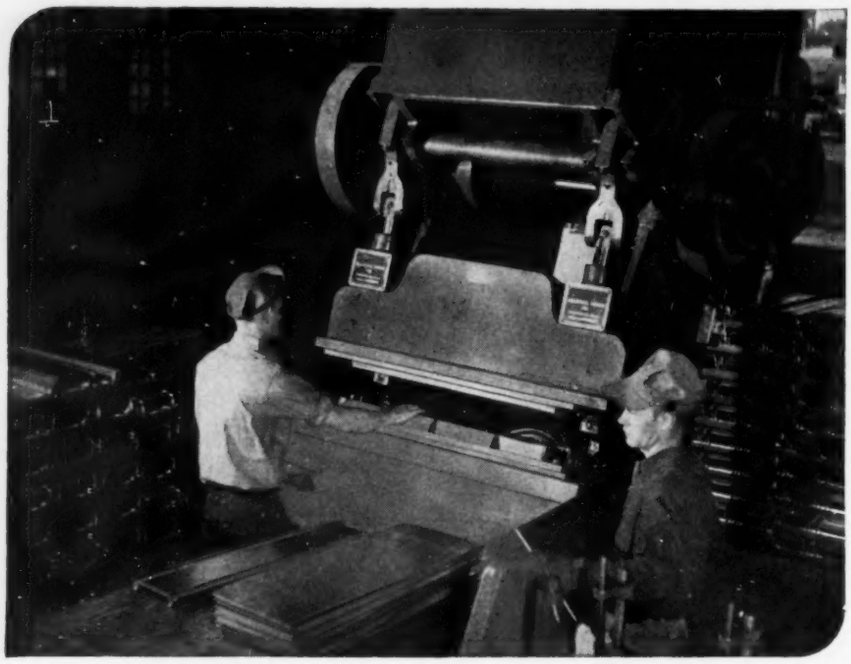
Equipment of foreign manufacture has heretofore been depended upon to a great extent to produce precision small gears. Interruption of the sources of supply of this equipment, occasioned by the war, is forcing the development of this type of machinery in the United States. Few realize the magnitude of the development which has taken place in our domestic industry and which has surpassed the equipment and the methods formerly used. At the evening session on Thursday, Tom Turner, manager, meter division, Westinghouse Electric & Mfg. Co., Newark, N. J., will lead off the discussion on precision small gear manufacture. He will be followed by George H. Sanborn, Fellows Gear Shaper Co., Springfield, Vt.; Arnold Thompson, chief designing engineer, Canadian Acme Screw & Gear Co., Canada, Ltd., Toronto, and a representative of the Barber-Colman Co., Rockford, Ill. Conventional methods of shaping and hobbing will be discussed, also the method of generation in automatic machines simultaneously with the blanking operations.

Tooling for Plastics

On the same evening a simultaneous session is to be held on the subject of tooling for plastics. This session has been planned to spread more knowledge about tools and processes for plastic production, together with information on little-known possibilities of the material. Speakers representing the pioneers in the development of the plastic industry will cover this subject and will tell not only what is being done, but some things that can not be done, as well as some things that probably will be done in the future. Those scheduled to speak are Joe Stewart, general foreman, plastics department, Ford Motor Co., Dearborn, Mich.; W. B. Ross, Die Molding Co., Canastota, N. Y.; and F. W. McIntyre of the Reed-Prentice Co., Worcester, Mass.

On Friday morning, four speakers will discuss the various phases of screw machine tooling. They are H. P. Berry, editor of *Screw Machine Engineering* and senior tool and gage designer, Naval Gun Factory, Washington; M. W. Taylor, foreman, screw machine department, Wright Aeronautical Corp., Paterson, N. J.; C. G.

HAVE YOU TRIED ZINCGRIP?



ARMCO ZINCGRIP takes this severe stamping job in stride. There's no flaking or peeling of the zinc on these door slats for grain bins.

• If you use galvanized metal in your products here's a sales-boosting cost-saving tip for the new year: ARMCO ZINCGRIP sheets or coils.

You'll find that this new kind of galvanized sheet can "take it" in severe forming and even moderate cold drawing operations. The zinc coating clings firmly to the base metal without peeling or flaking.

By using ZINCGRIP coils you can fabricate the metal easier and at less cost, speed operations, reduce your inventory of stock sizes and cut down scrap losses. You have a choice of three base metals: open-hearth steel, copper-bearing steel or extra-durable ARMCO Ingot Iron.

Then too you'll find ARMCO ZINCGRIP will give you some convincing talking points for those hard-to-sell prospects. Just tell us what you make or plan to make. Write The American Rolling Mill Company, 340 Curtis St., Middletown, Ohio. District Offices in Principal Cities.

ARMCO ZINCGRIP SHEETS
GIVE FULL PROTECTION

Stevens, mechanical superintendent, New Departure division, General Motors Corp., Bristol, Conn., and L. G. Gilbert, manager, time and methods department, Columbus-McKinnon Chain Corp., Tonawanda, N. Y. These speakers will cover all phases of this subject from the new system of calculating top rake on form tools to the latest set-ups for automatics, multiple spindle machines and turret lathes.

Punches and Dies

A simultaneous session will be held on Friday morning devoted to the subject of punches and dies for both small and large products. As wide a variety of applications as possible will be covered by the speakers, who are: W. T. Forde, manufacturing supervisor, International Business Machines Corp., Endicott, N. Y.; Gordon L. Reed, chief engineer, York Corrugating Co., York, Pa.; and Frank D. O'Brien, master mechanic, tool department, Eastman Kodak Co., Rochester, N. Y.

Tool Engineering Education

For the first time at a national meeting of the A.S.T.E., a session is to be devoted to tool engineering education. In this symposium, scheduled for Friday afternoon, tentative plans and suggestions will be formulated providing a closer relation with industry and various educational groups. Several viewpoints will be represented. Industries needs will be outlined by Clifford S. Stilwell, executive vice-president of the Warner & Swasey Co., Cleveland. Dean J. W. Barker, College of Engineering, Columbia University, New York, will describe the possibilities and limitations of the colleges in providing curricula along these specific lines. B. L. Bowsher, superintendent of schools, Toledo, Ohio, will present a plan for covering the fundamentals of tool engineering training in high schools and Thomas P. Orchard of the Technical Evening Classes, Paterson, N. J., will show where the vocational schools fit into this picture.

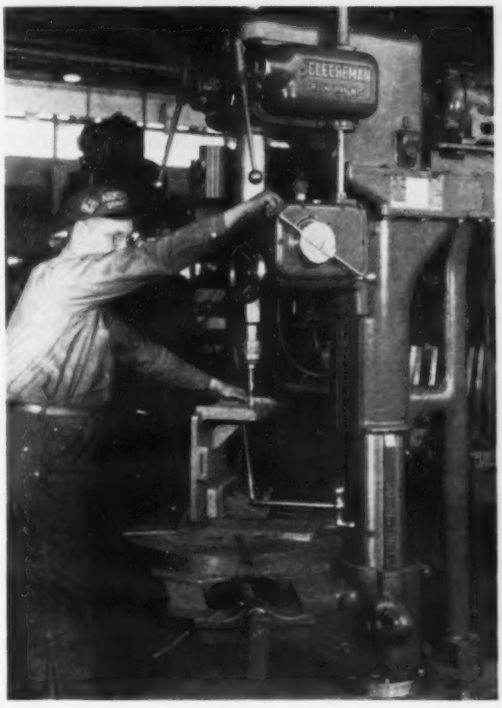
On Saturday morning another symposium is planned on cutting tools and materials. This session is offered to promote a better understanding of the proper application of the various cutting materials in their most economical and productive usage. E. S. Chapman, general works manager, Chrysler Corp., Plymouth division, will present the lead-off paper. L. C. Gorham of Gorham Tool Co., Detroit, an acknowledged authority on high speed steels, will present information covering the latest developments in this field. W. G. Robbins, president of the Carboloy Co., Detroit, will present the latest developments and applications of the carbides. The papers will be summarized by A. H. d'Arcambal of Pratt & Whitney, who will speak on "High Speed Steel Cutting Tools, Their Selection, Use and Care."

At the annual dinner on Friday evening, March 8, installation of officers will take place and the third and final report of the A.S.T.E. fact-finding committee will be presented. A speaker of national prominence in industry will address the society.

More Jobless in December

THE total number of unemployed rose in December to 8,428,000, according to the estimates prepared for the National Industrial Conference Board. This was 93,000 more than the 8,335,000 reported last month. The figure for December, 1938, was 9,304,000.

Armstrong-Blum Uses Cleereman Drilling Machines



HERE is a CLEEREMAN 30-Inch Machine drilling, reaming and tapping holes in a part for a MARVEL High Speed Sawing Machine in the plant of Armstrong-Blum Mfg. Co., Chicago.

You, too, can take advantage of the shop economies offered by CLEEREMAN Drilling Machines.

•

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Bryant Machinery & Engineering Company
400 W. Madison St., Chicago, Ill., U. S. A.
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DRILLING MACHINES and JIG BORERS

S. A. E.
ALLOY STEELS
HY-TEN
Send for Data Sheets
Write for data sheets giving compositions, physical properties, heat-treating guide and applications of our complete line. Keep them handy for reference and be prepared when you need steel in a hurry. Our seven convenient warehouses assure prompt deliveries.
Complete Stocks at
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NEWARK
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INDUSTRIAL and ORNAMENTAL
To produce the highest quality of perforated metal as used in the industrial arts and for ornamentation has been the ambition and persistent endeavor of this company. The highest quality best serves the user. We are here to serve you.

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5657 FILLMORE STREET—CHICAGO, ILL. **New York Office, 114 Liberty Street**

. . . OBITUARY . . .

COL. ARTHUR FARRAGUT TOWNSEND, chairman of the board of Raybestos-Manhattan, Inc., and general manager of the Manhattan Rubber Mfg. Division, Passaic, N. J., died of heart disease at his home in Ridgewood, N. J., on Jan. 14, aged 74 years. After his graduation from Massachusetts Institute of Technology, he joined the New York Belting & Packing Co. and left to organize the Manhattan Rubber Mfg. Co. in 1893.

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SAMUEL M. VAUCLAIN, chairman of the board of the Baldwin Locomotive Works, Philadelphia, died of heart disease at his home in Broadlawn, Pa., on Feb. 4, aged 83 years.

He started his apprenticeship in the railroad industry in 1872 in the Altoona shops of the Pennsylvania Railroad Co. and joined the Baldwin works in 1883 as foreman of the Seventeenth Street shop in Philadelphia. He rose rapidly to plant superintendent in 1886 and 10 years later became a partner in the firm. He was made vice-president in 1911 and president eight years later. He became chairman of the board in 1929.

❖ ❖ ❖

THOMPSON S. HANNA, formerly New York general sales manager of the Vulcan Crucible Steel Co., died in the Orange Memorial Hospital, East Orange, N. J., after a short illness on Jan. 25, aged 87 years. He retired 15 years ago.

❖ ❖ ❖

J. I. SIMMONS, vice-president of the John Simmons Co., New York, and general manager of the Simmons Pipe Bending Co., Newark, N. J., died in Montclair, N. J., on Jan. 31, aged 57 years.

❖ ❖ ❖

HAROLD P. ROSENBERG, purchasing agent of American Steel Foundries, Alliance, Ohio, and newly-elected member of city council, died at City Hospital in Alliance, Jan. 30, aged 49 years.

❖ ❖ ❖

ELMER E. PRICE, associated for many years with the sales department of Carnegie Steel Co., then with Carnegie-Illinois Steel Corp., died suddenly in New York City, Feb. 1, at the age of 57.

❖ ❖ ❖

JOSIAH N. BACON, senior partner of Bacon & Co., iron and steel, founded by his father, died suddenly, on Feb. 2, as he entered his automobile in front of his home, 274 Beacon St., Boston. Mr. Bacon was born in West Newton,

Mass., 66 years ago, and was associated with the company 30 years, until his retirement a few years ago.

❖ ❖ ❖

HARRY A. GRANT, for 30 years New England manager of the Penn Hardware Co. until his retirement two years ago, died at his home in Leeds, Me., Feb. 1, following a long illness. Mr. Grant was born in Leeds, May 2, 1863, was educated in Boston and most of his life lived in the Roxbury section of that city.

❖ ❖ ❖

ROBERT H. RICHARDS, manufacturers' agent with offices in the Curtis Bldg., Detroit, died Jan. 28. He was born in Harbor Beach, Mich., in 1895 and had lived in Detroit since 1916, working part of that time for the Ford Motor Co.

❖ ❖ ❖

ROBERT C. SPEIR, 81 years old, and, until 1936 employed by Murray Corp. of America as a tool engineer, died Jan. 27. He was born in Bay City and for 30 years served as chief engineer on the Blodgett Steamship lines on the Great Lakes, previous to his employment as a tool engineer, which position he held for 20 years. He retired in 1936.

. . . GREAT BRITAIN . . .

. . . Allies place large order for Welsh tin plate

LONDON, Feb. 6 (*By Cable*)—New British home trade prices, which are higher, have occasioned no surprise and are not likely to affect consumptive demand. The difference between pre-war and present prices goes into a central fund to meet extra costs on imports only, so producers still bear the burden of extra home costs due to increases in wages, transport charges, etc. Export prices on heavy steel have not yet been fixed, but they are expected to rise similarly though really nominal, as licenses are issued sparingly and home priority demands are restricting export expansion.

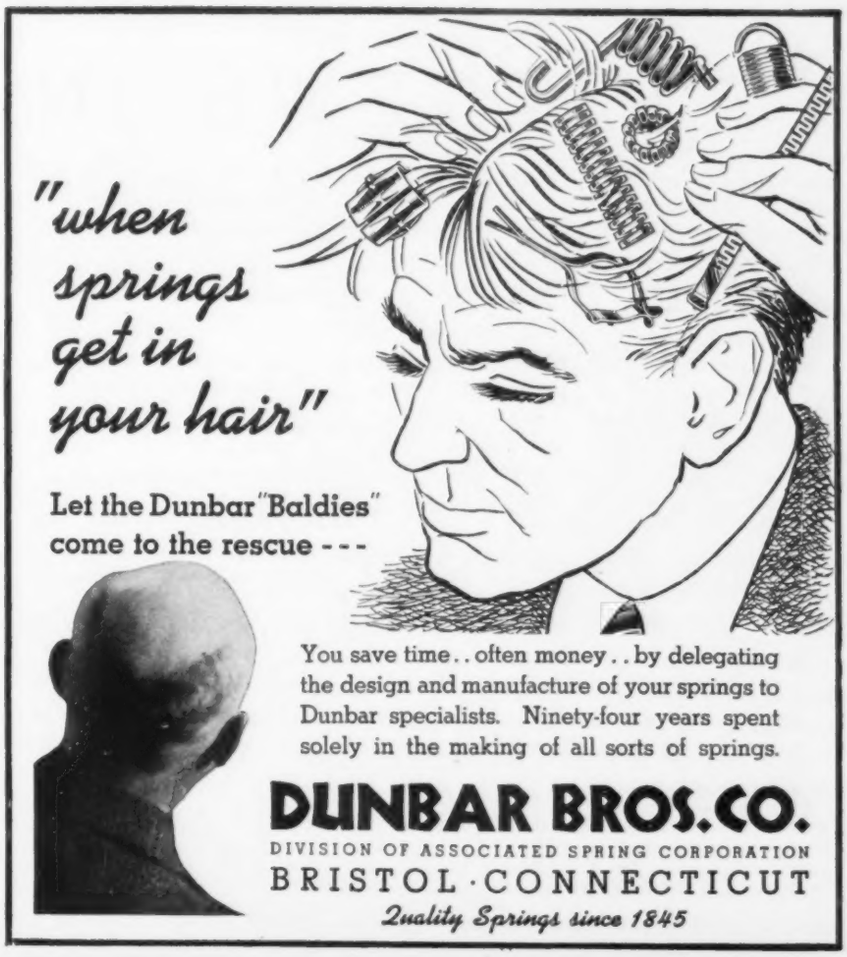
The Allies have placed a big order for Welsh tin plate so that works are now virtually sold out for some months with little available early deliveries.

The Continent reports quieter conditions in new business, but works are operating at full capacity on old orders.

Germany is renewing coke deliveries to Luxemburg.

Polish wire works in German occupied Poland joined the German Wire Cartel.

Swedish works are still booked for some months.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. . . THE NEWS IN BRIEF . . .

Automobile assemblies are gradually declining, but scaling down is not severe.—**Page 52.**

SWOC wins NLRB election at International Nickel Co. plant, 636 to 407.—**Page 55.**

Steel industry payroll last year second highest since 1929.—**Page 55.**

New Deal "doctors," after thorough diagnosis, still disagree on steel industry.—**Page 56.**

Court decisions prove fairness of NLRB field officers, Chairman Madden testifies.—**Page 58.**

Col. Fleming orders reorganization of Wage-Hour division.—**Page 58.**

Steel exports in December rose 18.4 per cent above November to 394,035 tons.—**Page 60.**

Manganese bids submitted Dec. 19 are rejected by Government. — **Page 61.**

Argentine authorizes $2,800,000 for railroads.—**Page 61.**

ICC finds further basing point revision injurious to Pittsburgh.—**Page 62.**

December machine tool exports 30 per cent above total in like month of 1938.—**Page 63.**

Arnold points to anti-trust revenue (fines) as justifying full appropriation for anti-trust division.—**Page 63.**

U. S. Navy contracts.—Page 64.

Barkley-Vinson stream pollution control bill may be revised.—**Page 64.**

Government awards.—Page 64.

Supplies for Army.—Page 64.

Clapp, maker of drop forgings, celebrates 75th anniversary.—**Page 65.**

Milwaukee Metal Trades Association accused by unions of discrimination in hiring.—**Page 66.**

Herrick Iron Works and Thompson-Diggs Co. construct new warehouses on West Coast.—**Page 66.**

Macklin Co., grinding wheel manufacturer, completes new addition to building at Jackson, Mich.—**Page 66.**

Comprehensive technical program is outlined for annual meeting of American Society of Tool Engineers.—**Page 69.**

Unemployed in December rose to 8,428,000 from 8,335,000 in November.—**Page 71.**

Carnegie-Illinois Steel Corp. awards contract for two batteries of coke ovens to Koppers Co.—**Page 77.**

J. L. Perry, Carnegie-Illinois Steel Corp. president, addresses Gary safety council.—**Page 77.**

Youngstown Sheet & Tube Co. profits last year total $5,004,484.—**Page 77.**

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Warehouse Prices	99
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MEETINGS

Feb. 8 to 10—Conference of Iron, Steel and Allied Industries, Del Monte, Cal.

Feb. 12 to 15—American Institute of Mining and Metallurgical Engineers, annual meeting, New York.

Feb. 14 to 16—Association of Highway Officials of North Atlantic States, Atlantic City, N. J.

Feb. 15 and 16—Wisconsin Chapter, A.F.A., and department of mining and metallurgy, University of Wisconsin, regional conference, Milwaukee.

March 7 to 9—American Society of Tool Engineers, annual meeting, New York.

March 14 and 15—Society of Automotive Engineers, national aeronautic meeting, Washington.

April 10 to 12—International Acetylene Association, annual convention, Milwaukee.

April 11 and 12—Galvanizers Committee of American Zinc Institute, annual spring meeting, Pittsburgh.

May 6 to 10—American Foundrymen's Association, annual meeting and equipment exhibition, Chicago.

May 20 to 22—American Gear Manufacturers Association, annual meeting, Asheville, N. C.

May 23—American Iron and Steel Institute, annual meeting, New York.

U. S. Steel Corp. by means of a map shows what would happen to restrict sheet distributing territories under Federal Trade Commission's proposed plan of uniform f.o.b. mill price basing.—**Page 79.**

Allegheny Ludlum Steel Corp. announces Pluramelt process for placing stainless surface on carbon steel.—**Page 80.**

Census Bureau sends enlarged questionnaires to mining industry.—**Page 80.**

Thirty inventors and research workers honored as "Modern Pioneers" in NAM-sponsored banquet at Cleveland.—**Page 81.**

AFL automobile union wins first closed shop referendum held by Wisconsin employment relations board.—**Page 84.**

Wisconsin refuses unemployment compensation to 56 strikers. — **Page 84.**

J. C. Argetsinger, vice-president, Youngstown Sheet & Tube Co., sees business in 1940 slightly above 1939.—**Page 84A.**

Machine tool deliveries will favor U. S. makers of aircraft, according to plan made at meeting with Treasury Secretary Morgenthau. —**Page 84A.**

Inland Steel Co. reports 1939 earnings of $10,947,250.—**Page 84B.**

Cuyahoga River straightening to benefit up-river steel plants in Cleveland during Great Lakes navigation season.—**Page 84B.**

Court to review decision on steel wage minimum.—**Page 84C.**

Canadian shipbuilding companies are given orders for anti-submarine boats.—**Page 84C.**

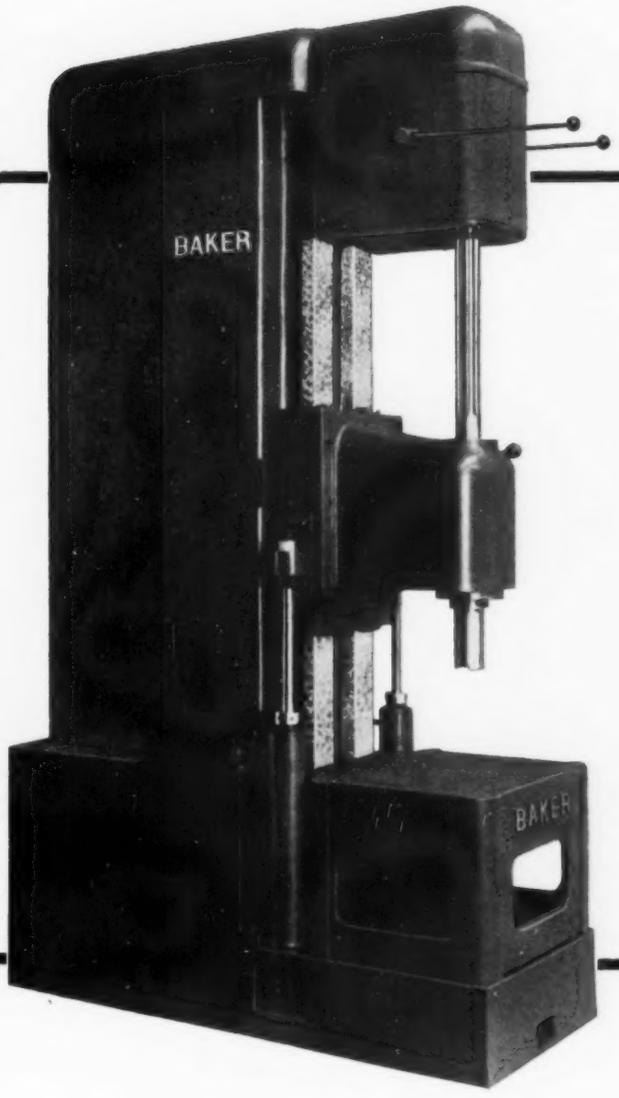
Steel Co. of Canada to make tin plate, finds war requirements for its products limited so far. — **Page 84C.**

Horace T. Potts Co., Philadelphia iron and steel warehouse company, celebrates its 125th anniversary. —**Page 91.**

Steel ingot production in January 5,017,588 tons, 83.18 per cent of capacity.—**Page 92.**

Republic Steel Corp. earnings for 1939 total $10,671,343.—**Page 100.**

Domestic machine tool orders have slackened in most centers, but volume of inquiries has increased on several big tooling programs in sight in Detroit. Commitments from foreign buyers slowed up because of long deliveries quoted. Aircraft engine builders seek priorities on deliveries. — **Page 100.**



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January Pig Iron Daily Output Drops 4.5%

PRODUCTION of coke pig iron in January totaled 3,600,020 gross tons, compared with 3,768,336 tons in December. On a daily basis January output dropped 4.5 per cent from that in December, or from 121,559 tons to 116,126 tons in January. The rate of operation dropped four points last month to 85.4 per cent of the industry's capacity from 89.4 per cent in December.

There were 177 furnaces in blast on Feb. 1 compared with 191 in operation on Jan. 1, a net loss of 14 furnaces. The 177 furnaces were operating at the rate of 110,705 tons daily, compared with 122,055 tons on Jan. 1. Fifteen furnaces were blown out or banked and one furnace was put in blast. The United States Steel Corp. blew out or banked six units, independent producers blew one in and took six out of operation, and three merchant units were taken off blast.

Among the furnaces blown out or banked were: One Duquesne, one Ohio, one Farrell, two Mingo, and one Gary, Carnegie-Illinois Steel Corp.; one Lackawanna, Bethlehem Steel Co.; one Norton, American Rolling Mill Co.; two Haselton, Republic Steel Corp.; two Campbell and one Iroquois, Youngstown Sheet & Tube Co.; one Federal, Interlake Iron Corp.; and a North Birmingham furnace, Sloss-Sheffield Steel & Iron Co.

The only furnace put in blast was a Bethlehem unit of Bethlehem Steel Co.

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1940	1939	1940	1939
January	3,600,020	2,175,423	38,607	20,805
February	.....	2,060,187	.....	18,655
March	.....	2,394,615	.....	16,908
April	.....	2,056,177	.....	11,518
May	.....	1,717,516	.....	7,888
June	.....	2,118,451	.....	16,617
½ year	.....	12,522,369	.....	91,491
July	.....	2,356,270	.....	21,213
August	.....	2,659,813	.....	20,628
September	.....	2,878,556	.....	21,949
October	.....	3,627,590	.....	23,944
November	.....	3,720,436	.....	30,356
December	.....	3,768,336	.....	36,298
Year	.....	31,533,370	.....	245,879

*These totals do not include charcoal pig iron.
†Included in pig iron figures.

Daily Average Production of Coke Pig Iron

Gross Tons

	1940	1939	1938	1937	1936
January	116,126	70,175	46,100	103,597	65,351
February	.....	73,578	46,367	107,115	62,886
March	.....	77,246	46,854	111,596	65,816
April	.....	68,539	45,871	113,055	80,125
May	.....	55,404	40,485	114,104	85,432
June	.....	70,615	35,400	103,584	86,208
½ year	.....	69,184	43,497	108,876	74,331
July	.....	76,009	38,767	112,866	83,686
August	.....	85,800	48,193	116,317	87,475
September	.....	95,952	56,015	113,679	91,010
October	.....	117,019	66,203	93,311	96,512
November	.....	124,015	75,666	66,891	98,246
December	.....	121,559	71,314	48,075	100,485
Year	.....	86,393	51,458	100,305	83,658

Merchant Iron Made, Daily Rate

Tons

	1940	1939	1938	1937	1936
January	14,710	10,603	10,635	16,106	10,537
February	.....	9,637	8,854	16,514	11,296
March	.....	8,951	8,524	16,457	10,831
April	.....	8,508	8,273	14,517	13,897
May	.....	7,038	6,431	19,483	12,814
June	.....	7,613	5,375	15,870	14,209
July	.....	8,396	5,495	19,609	11,619
August	.....	10,022	6,614	17,831	12,148
September	.....	11,293	11,205	20,065	12,526
October	.....	14,651	10,799	18,950	13,645
November	.....	14,859	13,208	15,662	14,739
December	.....	15,100	9,130	10,964	14,852

Production by Districts and Coke Furnaces in Blast

FURNACES	Production (Gross Tons) January (31 Days)	Production (Gross Tons) December (31 Days)	February 1 Number in Blast	February 1 Operating Rate, Tons a Day	January 1 Number in Blast	January 1 Operating Rate, Tons a Day
New York:						
Buffalo	211,693	238,704	10	6,285	11	7,700
Other New York and Mass.	14,346	13,902	1	465	1	450
Pennsylvania:						
Lehigh Valley	81,127	81,933	6	2,815	5	2,645
Spiegeleisen	10,455	10,453	2	335	2	335
Schuylkill Valley	44,842	50,932	3	1,445	3	1,645
Susquehanna and Lebanon Valleys	28,074	28,083	1	905	1	905
Ferromanganese	2,802	2,396	1	90	1	75
Pittsburgh District	821,783	833,024	38	25,985	39	27,340
Ferro. and Spiegel	16,583	13,902	3	535	3	450
Shenango Valley	51,381	71,951	3	1,395	4	2,320
Western Pennsylvania	108,627	93,900	6	3,505	6	3,030
Ferro. and Spiegel	15,840	13,980	1	510	1	450
Maryland	173,951	175,078	6	5,610	6	5,650
Wheeling District	136,151	184,350	6	4,095	8	5,480
Ohio:						
Mahoning Valley	355,938	393,123	13	9,185	18	12,680
Central and Northern	266,501	298,747	14	8,595	14	9,130
Southern	54,641	57,077	5	1,765	5	1,840
Illinois and Indiana	728,252	734,821	28	22,230	31	24,290
Michigan and Minnesota	129,161	133,752	7	4,165	7	4,315
Colorado, Missouri and Utah	57,060	38,405	4	1,840	4	1,660
The South:						
Virginia	.....	.....	0	....	0	....
Ferromanganese	3,187	3,166	1	105	1	100
Kentucky	26,348	26,722	1	425	2	860
Alabama	261,082	267,081	17	8,420	17	8,615
Ferro. and Spiegel	195	2,854	0	....	1	90
Tennessee	.....	.....	0	....	0	....
Total	3,600,020	3,768,336	177	110,705	191	122,055

Iden Urges Building Of Elevated Highways

CHICAGO — At the American Road Builders' Association show here early this month, V. G. Iden, secretary of the American Institute of Steel Construction, discussed the need for more construction of elevated highways. Mr. Iden quoted Dr. Miller McClintock, of Yale University, who in a report on the subject of elevated highways pointed out that San Francisco spends about $2,000,000 a year on street improvements, Chicago and Cook County, Ill., about $12,000,000 annually, while Detroit spent $18,000,000 to widen only one main thoroughfare. Dr. McClintock emphasized the advantages of traffic and increased safety that would have resulted had these sums been spent on elevated highway construction.

A proposed plan for a superhighway in Chicago calls for an initial expenditure of $110,000,000 with $95,000,000 more estimated for the future.

Sheet & Tube Profit $5,004,484 for 1939

YOUNGSTOWN SHEET & TUBE CO. and subsidiary companies report preliminary consolidated net profit for the year ending Dec. 31, 1939, of $5,004,484, compared with net loss of $658,933 for the year ending Dec. 31, 1938. The 1939 profit is estimated as being equal to $2.98 per common share.

The company reports profit from operations of $14,904,337 after providing for Federal income tax but before providing for depletion of minerals and depreciation.

Other income was $1,588,363 and other charges were $853,375, leaving a balance of $15,639,325. Interest on the funded debt and other interest charges amounted to $3,739,601, while provision for depletion of minerals and depreciation of plants was $6,895,239.

Perry Addresses Safety Group

CHICAGO—Speaking last week at an industrial safety forum sponsored by the Gary, Ind., safety council, John L. Perry, president, Carnegie-Illinois Steel Corp., classed disregard for safety with crime, disloyalty and disease as enemies to civilization.

Other steel officials appearing on the safety forum included E. E. Moore, general superintendent of Gary works; William Weir, safety director of Carnegie-Illinois; James M. Darbaker, general superintendent of the Gary sheet and tin mill; James E. Lose, vice-president in charge of operations, Carnegie-Illinois; Walter E. Hadley, manager of operations Chicago district, Carnegie-Illinois, and George P. Wardley, assistant vice-president in charge of industrial relations, Carnegie-Illinois.

New Coke Ovens at Gary

CHICAGO—The Carnegie-Illinois Steel Corp. has awarded a contract to the Koppers Co., Pittsburgh, to build two new batteries of coke ovens of 71 ovens each at Gary works. The 142 new ovens will be Koppers-Becker underjet type. Construction is to be started immediately and the ovens should be completed by the end of this year.

Amtorg Moves Office

THE Amtorg Trading Corp., official buying agency for the U.S.S.R., has moved its New York office from 261 Fifth Avenue to 210 Madison Avenue.

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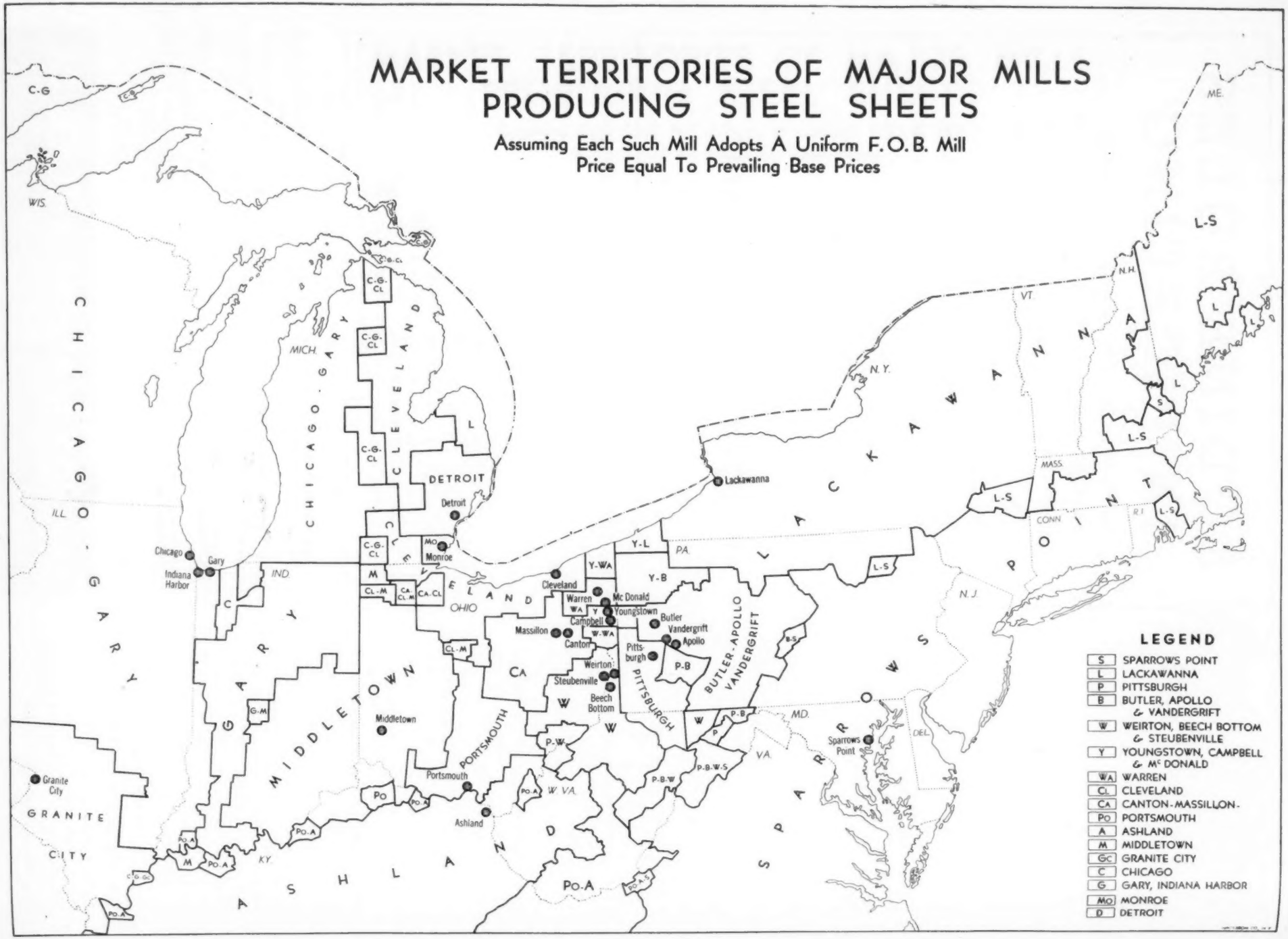
MARKET TERRITORIES OF MAJOR MILLS PRODUCING STEEL SHEETS

Assuming Each Such Mill Adopts A Uniform F.O.B. Mill Price Equal To Prevailing Base Prices



U. S. Steel Illustrates Some Effects of a Uniform f.o.b. Mill Price System

IN the data presented to the Temporary National Economic Committee by the United States Steel Corp. in support of the present basing point system of selling steel was a map (shown on opposite page) giving an example of the restriction of sheet distributing territories that would result from the plan proposed by the Federal Trade Commission for a uniform f. o. b. mill price system.

While pointing out that "the effects of this system would be extremely complex, and are therefore largely unforeseeable, the statement of the United States Steel Corp. says that this map is intended to "illustrate some of the complexities" which would result from the proposed new system.

Explaining the map, the United States Steel Corp. statement said:

"A uniform f. o. b. mill price system would require each mill to name a price at the mill applicable to all sales. The combination of mill price and transportation charges from mill to destination would determine the delivered cost of steel to the consumer. Generally, the delivered cost at any destination would vary as between different producing mills, and the consumer naturally would buy from the mill offering the lowest delivered cost, i. e., the mill having the lowest combination of mill price and freight from mill to the particular destination. A mill could sell only in the area in which the combination of its mill price and freight from mill to destination would be the lowest."

In order to ascertain the boundaries of each steel producing district under a uniform f. o. b. mill basing system it was necessary for the traffic departments of the United States Steel Corp. to make thousands of freight rate calculations as the limits of each district would be fixed by the distances, measured in freight costs, that could be covered by one mill before meeting the same or lower delivered cost from a mill in another district.

Based on Single Relative Price

"This map," U. S. Steel explains, "necessarily pictures the situation at a single relative price level. Differences in relative price levels would change market territories of mills, but would not eliminate the pattern of local monopoly and fixed territories here shown. A mill in close proximity to other mills would tend to swallow up their entire market areas in seeking to widen its own market area by lowering its mill price. At any relative level of their prices, two mills could generally compete in only one important market, since automatically the price of the first would exclude the second, or the price of the second would exclude the first, from every such other market."

In the map shown on the opposite page 17 major sheet producing districts are delineated as they would appear if all were operating under a uniform f. o. b. mill price system, assuming present freight rates and mill prices equal to present base prices at nearest basing points, or, in other words, equal prices at all mills except at Detroit and Granite City, where the mill price is $2 higher and at Monroe, where the mill price is $3 higher. On this map territories are determined by counties according to freight rates to one or two key towns, and mills adjacent to each other are considered as a single producing point.

Under this set-up, says U. S. Steel, "Local monopolies are the rule, competitive areas the exception. All important sheet markets are in the monopoly area of a single producing point, or a producing point group such as Chicago-Gary. Sheet consumption is slight in areas of competition. Size of monopoly area depends generally upon the proximity of other mills. Sparrows Point and Lackawanna together have monopolies of all North Atlantic seaboard markets. Chicago-Gary has a monopoly of Wisconsin, northern Illinois, northern Indiana and western Michigan. In contrast, western Pennsylvania and eastern Ohio mills, having large capacities, are restricted to small areas.

"Territorial allocation is extremely arbitrary. Warren and Youngstown mills, for example, each have monopolies in their home counties; they share territories to the north of Warren, but Warren, passing Youngstown, reaches territory south of Youngstown, which Youngstown cannot reach. Chicago-Gary mills share most territory which either can reach, including the home county of each; but Chicago, passing Gary, has a monopoly in certain Indiana counties; and Gary, after passing exclusive Chicago territory, has a monopoly in many other Indiana counties."

Some Accessible to Only One Mill

U. S. Steel Corp. also presented another map, not shown here, which gives in more detail, upon the same assumptions as are stated above, the situation that would result in certain counties of western Pennsylvania and eastern Ohio, where sheet rolling facilities are highly concentrated. Notwithstanding the large number of mills in that area, many towns are accessible to only one mill. For example, Columbiana County, Ohio, is in an area of competition between Warren and Niles, Ohio, mills and mills in the Weirton - Beachbottom - Steubenville area, yet three towns in that county are accessible to Niles only, one town to Steubenville only and one town to Canton only. Similarly Westmoreland County, Pa., is in an area of competition between the Pittsburgh group of mills and the Butler-Vandergrift-Apollo mills, but actually the Dravosburg mill has a monopoly in six towns, the Vandergrift mill in another, while Dravosburg and Apollo compete in one town, and Pittsburgh, Brackenridge and Vandergrift compete in another.

Relative Price Level Would Change

"There would undoubtedly be changes in the relative levels of prices for sheets at producing point groups, and prices at producing points surrounded by other producing points would naturally be lower than at the surrounding points. A small reduction in price would result in increasing a mill's territory for the sale of sheets, but in many cases the added territory would not increase the market proportionately. In order to sell sheets in any important market a mill would have to reduce its price by the amount of the freight to such market. In many cases this would arbitrarily result in wiping out or greatly reducing the selling area of other mills, compelling retaliation by them, which in turn would deprive the first mill of access to the market sought by such

mill in making the price reduction. The price would be lower, with little or no real gain in marketing area.

"Furthermore, mills at two or more producing points could compete, generally, at only one consuming point at the same time. If the Pittsburgh and Youngstown mills, for example, were to quote mill prices for sheets which would enable them to compete in Cleveland, the Youngstown mills would automatically be excluded from the Detroit market, as the Pittsburgh mill price would result in a lower price in Detroit. Likewise, if prices at Pittsburgh and Youngstown mills were such as to result in equal competitive prices in Detroit, the Pittsburgh mills would be excluded from the Cleveland market. It is impossible to foresee what steps the mills would be forced to take to escape the procrustean rigidity of this system. Possibly the result would be merely the installation of final finishing mills at important markets. Such a change would result in no saving in transportation costs, and ultimately could only result in higher steel prices, since costs would be enormously increased."

Stainless Surface on Carbon Steel in New Product Called Pluramelt

PITTSBURGH — Allegheny Ludlum Steel Corp. has this week announced a new steel making process known as Pluramelt, which in its more popular form consists of a metal having a stainless steel surface with ordinary carbon steel being the other component part.

Although experience so far has been limited to pluramelts of stainless alloys on soft or medium steel and tool steel types on soft steel bases, it seems very likely, according to the company, that the commercial success of these materials may be duplicated with any other alloy that can be melted in an arc furnace.

After intensive investigation, Allegheny Ludlum was able to produce a composite steel in which both component analyses were at least in part molten at the same time in order to secure absolute metallic continuity. The trade name was taken from the words plural melting. The result has been accomplished by means of a special type of electric arc melting furnace so designed that the melting operation could be carried on and the final product would be intermelted with any other metal part and allowed to solidify as an inseparable portion of the unit mass.

Licensed by Kellogg

Robert K. Hopkins, director of metallurgical research, M. W. Kellogg Co., Jersey City, N. J., in seeking a different type of steel to fulfill the requirements of the petroleum industry for pressure vessels such as his company manufactures, carried on considerable research work and subsequently discussed the problem with Allegheny Ludlum, and, as a result, the steel company decided to participate in the further development. This work culminated in the construction of a plant at Brackenridge, Pa., which is now in commercial operation under exclusive license from the M. W. Kellogg Co. under the Hopkins patents.

Pluramelt in its numerous analyses is the product of an electric furnace melting technique, as a result of which all of the special composition materials and a small part of the low-cost materials are melted and integrally joined during this operation. The furnace proper is radically different from the conventional type of electric furnace in that the functions of steel making and of the mold are combined. In this way special steels are melted and joined to low-cost steels in ingot form, thus producing Pluramelt ingots.

The composition of the special steels, according to the company, is controlled simply and within the ranges specified in commercial practice of today. It is said the process produces single ingots of two or more compositions, integrally bonded together, and it is possible to change the composition within limits during the melting operation.

Thus far the materials which have been successfully produced are Allegheny metal 18-8S (low carbon, 18 per cent Cr, 8 per cent Ni); the same with columbium, molybdenum or both; low carbon 13 per cent chromium steel; and various tool steel compositions for the alloy portion, and low carbon and carbon-molybdenum steels for the massive portion. In the majority of cases the massive material is plain low carbon steel. Ingots have also been produced of three compositions integrally joined. These ingots have been processed into plates and sheets down to 24 gage. Pluramelt wire has also been produced.

The company demanded of its product the following principal requirements: A joint between compositions —base and surface layer—that is flawless; uniform and correct composition in both base and surface layers; and ease in fabrication. A series of exhaustive bend tests, tension tests, punch tests, and compression tests were made with hundreds of samples of various compositions and shapes and according to the company, fulfilled the principal requirements enumerated above. In all cases the company found that the bond between the two component metals was not at all disturbed, and that there had been no perforation and no "skidding" of the stainless surface.

Additional tests including quenching from temperatures ranging from 1300 to 1700 F. were made on specimens without sign of checking, both the surface and the bond remaining unimpaired.

According to Allegheny Ludlum, Pluramelt lends itself well to shop fabricating practices and can be fabricated in any way that is now used for other metals.

Census Bureau Gathers Mining Industry Data

WASHINGTON—Asking for much new information, the Bureau of the Census has sent questionnaires to mining and quarrying interests. The individual returns will be tabulated and published in national, state and industry totals. Comparable 1939 figures are being sought on number of mines, employment and other basic matters. The schedules also ask for costs of buildings, machinery and equipment erected or installed during 1939, and the number of mechanical-power loading machines in use or available by types.

In collecting figures on value of 1939 production, special effort is being made to arrive at a total which will represent the value actually received by the mining industries for ore as contrasted with available current statistics on values that generally represent the selling prices of pig metal in the basing point areas.

Preliminary summaries of the basic facts will be published by late summer or early fall, with special trade reports following as rapidly as possible.

Industry Honors Modern Pioneers At NAM Banquet in Cleveland

CLEVELAND—Thirty inventors, research workers and scientists from northeastern Ohio and western Pennsylvania were given recognition as "Modern Pioneers" and awarded certificates of merit for their scientific contributions at a banquet here Feb. 7.

Sponsors of the Cleveland dinner, which was in recognition of the 150th anniversary of the founding of the patent office, included the National Association of Manufacturers, the Associated Industries of Cleveland and the Ohio Manufacturers' Association. W. T. Holliday, president of Standard Oil Co. of Ohio, served as chairman of the local arrangements committee. Walter D. Fuller, president of Curtis Publishing Co., was scheduled as the principal speaker.

The Cleveland dinner was one of a series held in the principal industrial areas of the United States under the auspices of the National Association of Manufacturers. This series will be climaxed with a national dinner celebration to be held in New York on Feb. 27.

Members of the Committee

The Cleveland committee, in addition to Mr. Holliday, included: J. C. Argetsinger, vice-president and general counsel, Youngstown Sheet & Tube Co., Youngstown; Fred P. Auxer, president, National Telephone Supply Co., Cleveland; H. G. Batcheller, president, Allegheny Ludlum Steel Corp., Brakenridge, Pa.; George A. Blackmore, president, Westinghouse Air Brake Co., Pittsburgh; R. C. Brower, secretary and treasurer, Timken Roller Bearing Co., Canton, Ohio; L. N. Brown, Chicago Pneumatic Tool Co., Cleveland, and George Case, chairman of the board, Lamson & Sessions Co., Cleveland.

Nominees for "Modern Pioneers" included: Carl Beal, American Anode, Inc., Akron, Ohio, instrumental in the development of the electro-deposition of latex rubber on metal; Joseph Becker, vice-president and general manager in charge of construction and engineering, Koppers Co., Pittsburgh, for his contributions to coke-oven technology and improved designs; Tracy V. Buckwalter, vice-president, Timken Roller Bearing Co., Canton, who has contributed inventions and the development of new products in the field of both industry and transportation; Arthur F. Case, consulting engineer, the Wellman Engineering Co., Cleveland, whose revolving car dumper was the first of its type equipped with fully automatic, gravity-operated car clamps; Dr. Frank Conrad, assistant chief engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., actively identified with the inauguration of medium and long wave broadcasting, and who subsequently helped develop short-wave broadcasting.

Engineers Are Honored

Joseph V. Emmons, metallurgical engineer, Cleveland Twist Drill Co., who played an important part in the development of molybdenum-tungsten, high speed, and other alloy steels, in which molybdenum is the principal alloying element; Clyde C. Farmer, director of engineering, Westinghouse Air Brake Co., Wilmerding, Pa., who was responsible for the invention and development of what is known as the "AB" brake, now the standard brake for all American railroads; Lars O. Grondahl, director of research and engineering, Union Switch & Signal Co., Swissvale, Pa.

Ralph E. Hall, Ph.D., director, Hall Laboratories, Pittsburgh, who in collaboration with H. A. Jepson, discovered the capacity of sodium hexametaphosphate to hold calcium in solution and applied it to boiler water conditions; Alfred F. Harris, engineer and chairman of the board, Harris, Seybold, Potter Co., Cleveland, responsible for the development of what is known as the offset lithographic method of printing, and developed machinery necessary for the exploitation of this method; William J. Harshaw, president and director of research, Harshaw Chemical Co., Cleveland, who has directed the work of many chemists to the successful development not only in processes that bear his name, but also many others; John K. Hodnette, electrical engineer, Westinghouse Electric & Mfg. Co., Sharon, Pa., inventor of a new distribution transformer which incorporates built-in protective devices permitting it to carry successfully even direct strokes of lightning and continue to render service without interruption; Joseph F. Joy, director of research and development, Joy Mfg. Co., Franklin, Pa., who has specialized in the creation of machinery useful in the art of mining coal.

James B. Kirby, Apex Electrical Mfg. Co., Cleveland, for his washing machine and vacuum cleaner improvements; Hayden B. Kline, Industrial Rayon Corp., Cleveland, who conceived the new continuous rayon process; Samuel B. Kraut, electrical engineer, Westinghouse Electric & Mfg. Co., Cleveland, inventor of sodium lamps for highway illumination; John C. Lincoln, chairman of the board, and James F. Lincoln, president, the Lincoln Electric Co., Cleveland, for their pioneering achievements in the field of electrical arc welding; Dr. Walther Mathesius, vice-president in charge of operations, United States Steel Corp., Pittsburgh, Pa., whose research resulted in an entirely new order of product control, in the steel industry.

R. D. McDill, president, Inspection Machinery Co., Cleveland, for work on the retardation of oxidation of fresh fruits; Frank E. Moore, president, Mathews Conveyor Co., Ellwood City, Pa., who has been instrumental in guiding and directing the basic development of the gravity conveyor; Marvin Pipkin, chemical engineer, General Electric Co., Lamp Development Laboratory, Nela Park, Cleveland.

Steckel Gets Award

Carl F. Prutton, Case School of Applied Science, Cleveland, for his discovery of a new principle of lubrication; Waldo L. Semon, research chemist, B. F. Goodrich Co., Akron, whose research work assisted the plasticized, highly polymerized vinyl chloride, known commercially as Koroseal; Abram P. Steckel, Cold Metal Process Co., Youngstown, whose research has applied particularly to the development of a new cold process for making economically thin sheet metal, hitherto made by hot rolling in packs, notably commercial tin plate; W. C. Stevens, machine designer, Firestone Tire & Rubber Co., Akron, who has several score inventions to his credit relating to tire building machines.

Joint award to Brush Laboratories Co., Cleveland, and Bengt Kjellgren, vice-president, and Charles Baldwin Sawyer, chairman, for solving the problems involved and successfully developing methods of producing practical piezo-electric acoustic devices, and Harry M. Naugle, chairman, Rotary Electric Steel Co., Detroit, for numerous inventions used in connection with the development of the continuous strip mill; honorable mention to Harry Lloyd Benner, E. I. du Pont de Nemours & Co., for work with others on invention of process for high-speed copper plating.

. . PERSONALS . . .

FRANZ T. STONE, president, Columbus McKinnon Chain Co., Columbus, Ohio, recently was awarded the distinguished service award key as a reward for the most outstanding service to the community. This award is given annually to a man between the ages of 21 and 35 by the Columbus Junior Chamber of Commerce.

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ROBERT F. HERRICK, of Boston, has been made president of Scott & Williams, Inc., Laconia, N. H., manufacturer of knitting machinery, to succeed the late Walter L. Toy. HARRY J. KELLEY, treasurer of the company, will be resident head of the plant.

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M. L. JACOBS, since September of last year assistant to C. A. BUCK, vice-president in charge of raw materials of Bethlehem Steel Co., Bethlehem, Pa., has been appointed vice-president in charge of raw materials. Mr. Buck will continue as vice-president and as a director, serving in a consulting and advisory capacity.

Mr. Jacobs joined Bethlehem in 1916, after several years in the light, power and construction fields. Four years later he was made manager of quarries, Bethlehem Mines Corp., and in 1934 was appointed general manager of quarries, Bethlehem Steel Co., continuing in that capacity until September of last year, when he became assistant to Mr. Buck.

Mr. Buck was one of the group of men selected by the late Charles M. Schwab following his acquisition of Bethlehem to assume important responsibilities. Mr. Buck became identified with the company in 1887 after his graduation from Lehigh University. Prior to becoming vice-president in charge of raw materials in 1913, he served as assistant chemist, chemist, general superintendent of the blast furnace department, assistant general superintendent, and general superintendent. He has been a director of Bethlehem Steel Corp. since 1914.

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ROBERT A. PETERSON, a department superintendent at the Gary works of Carnegie-Illinois Steel Corp., has been appointed superintendent of hot mills at the Cuyahoga works of American Steel & Wire Co., Cleveland. He succeeds A. G. MONTGOMERY, who previously was appointed assistant chief engineer. After leaving Worcester Polytechnic Institute, he worked for the Morgan Construction Co., from 1920 to 1930, leaving the position of erection to become manager of heavy mill sales for the Aetna Standard Engineering Co., Youngstown. In 1934 Mr. Peterson became associated with American Steel & Wire Co. as rolling mill adviser and two years later was made assistant superintendent of merchant, wheel and axle mills at the Gary works. In 1937 he was made superintendent of the merchant bar mills. R. W. H. ATCHERSON has been appointed as Mr. Peterson's successor, having served as special engineer at the Gary works since 1929.

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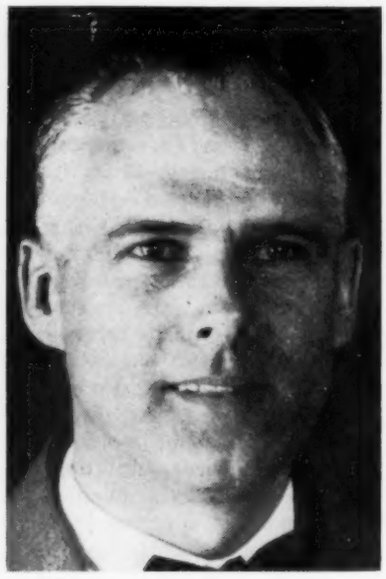
HERBERT G. R. BENNETT, assistant general superintendent, Carnegie-Illinois Steel Corp.'s Duquesne, Pa., works since 1933, has been appointed to the staff of the corporation's chief engineer at Pittsburgh. Mr. Bennett joined the former Carnegie Steel Co. at Youngstown in 1907. After working for the company at Milwaukee, he returned to Youngstown in 1908 and in 1925 was appointed assistant superintendent of bar mills and went to Duquesne as assistant general superintendent in 1933.

WALTER A. JAYME, general superintendent of the McKeesport, Pa., plant, has been appointed assistant general superintendent, Duquesne works, succeeding Mr. Bennett. Mr. Jayme joined the metallurgical division of Carnegie-Illinois in 1935, became manager of the alloy division in 1936 and was made general superintendent of Wood works in 1937.

CARL M. NYSTROM has been appointed general superintendent of Carnegie-Illinois' Wood works, where he began as a metallographist in 1926. He was made foreman of the chrome pol-

M. L. JACOBS, vice-president in charge of raw materials of Bethlehem Steel Co.



ROBERT A. PETERSON, new superintendent of hot mills at Cuyahoga works, American Steel & Wire Co.

HERBERT G. R. BENNETT, appointed to the staff of the U. S. Steel Corp.'s chief engineer at Pittsburgh.

ishing and inspection department in 1928 and assistant general superintendent of the plant in 1937.

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JOHN W. LOHNES has been appointed assistant general manager of sales of the Vanadium Corp. of America, New York. Mr. Lohnes has been assistant to general manager of sales for the past year. DONALD C. HOSTETTLER, who has been Eastern sales representative, has been transferred to take charge of the corporation's Detroit district sales office as sales representative, to succeed J. BERENS WATERS, who is assuming the duties of general purchasing agent. JOHN B. GIRDLER has been appointed Eastern sales representatives to succeed Mr. Hostettler.

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JOHN F. SMITH, JR., who has been identified with the Inland Steel Co., Chicago, since 1929, has been made manager of the order department, succeeding Powell Pardee, who will assume special duties in the department of inspection and metallurgy. Mr. Smith joined the order department in 1930 and the following year spent a brief period in the company's Detroit sales office. He returned to main office order department in 1932 and was made assistant manager of that department five years later.

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EDWARD D. EMERSON, district sales manager of the Babcock & Wilcox Tube Co., New York, has been appointed general manager of sales for the John A. Roebling's Sons Co., Trenton, N. J., effective March 1.

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ELTON HOYT, II, senior partner of Pickands, Mather & Co., Cleveland, has been elected president of Interlake Steamship Co., owner and operator of the second largest fleet of bulk freighters of American registry on the Great Lakes. He succeeds the late Henry G. Dalton.

FRANK ARMSTRONG, a partner in Pickands, Mather & Co., has been elected to the late Mr. Dalton's place on the board of directors and made vice-president, succeeding Mr. Hoyt.

Mr. Hoyt was graduated from Yale University in 1910. The following year he entered the employ of Pickands, Mather & Co. in the iron ore department and in 1922 was admitted as a member of the firm. In August of that year he was made a managing partner of the company.

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RALPH B. MEISENHELDER, who has been identified with the York Ice Machinery Corp. and its predecessors in 1906 as a clerk in the pipe shop office, has been appointed assistant to STEWART E. LAUER, president of the company.

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C. H. MCGRATH, for many years general purchasing agent of the American Brake Shoe & Foundry Co., New York, has been appointed assistant to WILLIAM B. GIVEN, JR., president. W. T. KELLY, JR., formerly assistant to the general purchasing agent, succeeds Mr. McGrath as general purchasing agent.

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PAUL LINDBERG, until recently superintendent of rolling mills of the steel and tubes division of Timken Roller Bearing Co., Canton, Ohio, has been appointed superintendent of rolling mills of the steel division of the Copperweld Steel Co., Warren, Ohio. He began steel mill work as a roller in Swedish steel mills. He first worked in this country for the United States Steel Corp. and was subsequently a roller, foreman and assistant in charge of rolling for the old United Alloy Steel Corp.

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JOHN S. ISDALE has been made representative in Connecticut for the Ajax Electric Co., Philadelphia. He will make his headquarters at 144 Curtis Street, Meriden, Conn.

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H. C. SAUER, for the past nine years identified with the Chicago office of Timken Roller Bearing Co., Canton, Ohio, has been made manager of the New York district office, succeeding J. W. BERRIMAN, who has taken an indefinite leave of absence because of illness. L. J. HALDERMAN, for the past 10 years manager of the Kansas City branch office, has been transferred to Chicago, and F. A. WEISENBERGER,

WALTER A. JAYME, appointed assistant general superintendent, Duquesne works, Carnegie-Illinois Steel Corp.

CARL M. NYSTROM, general superintendent, Wood Works, Carnegie-Illinois Steel Corp.

JOHN F. SMITH, JR., new manager of the order department of Inland Steel Co.

heretofore of the Pittsburgh sales staff, becomes manager of the Kansas City office.

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H. B. KRAUT, president and general manager, Giddings & Lewis Machine & Tool Co., Fond du Lac, Wis., has been elected a member of the board of trustees of the Y.M.C.A. in Fond du Lac.

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F. M. HUFFMAN, since March, 1938, assistant manager of sales at Baltimore for Bethlehem Steel Co., has been appointed assistant general traffic manager, with headquarters at Bethlehem, Pa. He joined the company upon his graduation from Lehigh University in 1922. The following year he was assigned to the Philadelphia sales office and later transferred to Chicago. He was appointed manager of sales at St. Louis in 1936 and from there went to Baltimore to the post he held prior to his present appointment.

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K. L. HANSEN, vice-president, American Welding Society, and chief engineer of the Harnischfeger Corp., Milwaukee, discussed "Hazards in Electric Arc and Gas Welding," at the Racine (Wis.) Industrial Safety Council meeting recently.

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JOHN O. OSTERGREN has been elected president and general manager of the Lakey Foundry & Machine Co., Muskegon, Mich. He succeeds HERMAN A. BECKER, who has been president since 1918. Mr. Becker continues as a director.

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JAMES WILSON, formerly superintendent of the Cleveland division of Fisher Body Corp., has been named resident manager of Fisher Body plant No. 23 in Detroit.

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PAUL L. TURGEON, recently labor relations supervisor at Dodge plant of Chrysler Corp. in Detroit, has been selected as manager of the newly-organized Lansing Safety Council.

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L. R. WESTBROOK, formerly assistant director of the Cleveland experimental laboratory of the Grasselli Chemicals Department, E. I. du Pont de Nemours & Co., has been appointed research manager of the company's electroplating division.

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NEALE E. STEARNS, affiliated with the faculty of the School of Business and Commerce at the University of Chicago, has been appointed supervisor of business procedures by Inland Steel Co., Chicago.

F. M. HUFFMAN, assistant general traffic manager of Bethlehem Steel Co.

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COLEMAN SELLERS, 3rd, of the Midvale Co., Philadelphia, has been elected a member of the board of managers of the Franklin Institute, Philadelphia.

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RICHARD L. DAVIES has been made manager of the newly-established market research department of the Pennsylvania Salt Mfg. Co., Philadelphia.

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E. L. MCILHENNY, formerly identified with the Cleveland office of the Detroit Rex Products Co., Detroit, has been made manager of the alkali division, in charge of sales and service of the company's line of alkali cleaners. He is a graduate of Washburn College and took post-graduate work at the University of Minnesota. He has spent the past 13 years in the metal cleaning industry.

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EARL G. GOEHLE, formerly associated with the Michigan Seamless Tube Co., South Lyons, Mich., has been made production and factory manager of the Tube Reducing Corp., Newark, N. J.

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A. F. COLLING has been appointed executive vice-president of the Wackman Welded Ware Co., St. Louis. He will make his headquarters at the New York district sales office in the Chanin Building.

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EDWARD J. LEISER, superintendent of the Milwaukee works of the International Harvester Co., is retiring after 35 years of continuous employment with the company. He got his first job as a clerk in the gas engine department and saw the production of farm tractors jump from five a week in 1907 to 125 a day at present. He rose successively to chief clerk in the order department; production manager, foundry manager, assistant superintendent and superintendent in 1929.

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FRED G. HEISS, treasurer and a director of the Elwell-Parker Electric Co., Cleveland, for 22 years, started on a six months' leave of absence Jan. 31. In honor of the event he was given a testimonial dinner by his associates in the company on Feb. 1, in the Terminal Club at Hotel Cleveland. Mr. Heiss plans to locate in Florida and make trips to various points in the South.

Wisconsin Refuses State Compensation for Strikers

WAUKESHA, Wis. — Fifty-six employees of the Waukesha Motor Co., who sought to collect unemployment compensation from the state of Wisconsin for the period covering a four weeks' strike at the plant, were refused by the commission which denied liability because a labor dispute was the reason for unemployment. The claims amounted to $2,600.

AFL Auto Union Wins Closed Shop Referendum

MILWAUKEE — AFL - United Automobile Workers local union won the first closed shop referendum held by the Wisconsin employment relations board under the new state labor law. The terms include a 40-hr. week, time and a half for Saturdays, double time for Sundays and holidays, from 5c to 7c an hour increase in pay, paid vacations, a steward system and shifting of employees unable to stand heavy work to lighter operations.

Unions Vote to Rejoin CIO

JANESVILLE, WIS.—Last week local UAW unions at the Fisher Body and Chevrolet plants here, voted to renounce the AFL with which they had been affiliated since last spring, and to rejoin the CIO.

Machine Tool Deliveries to Favor U. S. Aircraft Makers

WASHINGTON — Fitting in with the national defense program, machine tool manufacturers have voluntarily agreed to give priority of deliveries to American manufacturers of airplanes and airplane engines. The plan was arranged at a meeting here last Tuesday and Wednesday with Secretary of the Treasury Henry Morgenthau, who will serve as a liaison between the machine tool and airplane makers for the purpose of speeding up airplane production for the War and Navy Departments.

Airplane manufacturers, like machine tool producers, are heavily booked with both domestic and foreign orders, and had complained that production schedules were held up by reason of delayed deliveries of machine tools. The airplane producers previously had pledged priority in deliveries to the United States Government.

Machine tool makers, when informed of the plight of airplane manufacturers, readily agreed to give them priority. While airplane producers had described delayed deliveries of machine tools as the "bottleneck" in engine output, machine tool manufacturers said that there is no "bottleneck." They gave assurance, however, that they can rearrange their orders, and, now acquainted with requirements, estimate that at their first meeting to work out a priority system they will get 80 per cent compliance from the industry.

Machine Tool Committee

It was stated that the arrangements for setting up the priority system will be in charge of a committee of machine tool manufacturers and that the government will participate only to the extent of acting as a contact. Another conference was scheduled to be held in Washington on Wednesday of this week at which an enlarged group of machine tool builders will be present.

Machine tool makers were informed that from the standpoint of national defense, it was only reasonabe that they, like engine and airplane manufacturers, should follow a priority system in favor of domestic orders.

Recently President Roosevelt named an interdepartmental committee to protect the United States by preventing conflict of foreign buying with army and navy requirements. Heading the committee, which is making a nationwide survey of the situation, is Capt. Harry E. Collins, director of the Procurement Division, Treasury Department. Other members are Maj. Gen. Henry Gibbons, army quartermaster general, and Rear Admiral Ray Spear, navy paymaster general. Secretary Morgenthau is liaison officer between the committee and the White House.

Capacity Found Unbalanced

Several weeks ago an informal survey conducted by the Administration under Secretary Morgenthau's direction revealed that the productive capacity of the aircraft industry was unbalanced in that about twice as many planes can now be built a month as engines with which to power them. Since September, the aircraft engine plants have placed huge orders for machine tools on which deliveries are now due, some one to two months late. The recent survey indicates, however, that further large quantities of machine tools must be bought soon to restore some semblance of balance in the productive capacity of the industry as a whole. Meanwhile new buildings have been erected and await occupancy of the needed equipment.

The situation is further complicated in that the aircraft engine industry is in a transition stage from job-lot production to mass production methods comparable with those employed in the automotive industry. The equipment being purchased is tending more and more to special purpose types, necessitating the construction of special tools and fixtures which even under ordinary conditions take months to manufacture. Such machines have been quoted up to a year or more ahead in point of delivery. Up until now, orders from the aircraft industry have been accepted on the basis of first come, first served.

Morgenthau Visits Plants

Early this week, Secretary Morgenthau visited both the Pratt & Whitney plant at Hartford, Conn., and the Wright Aeronautical Corp. plant at Paterson, N. J. He reported that both companies had already felt the benefit of the meetings held last week. Asserting that both Pratt & Whitney and Wright reported that they had received only about 25 per cent of the machine tools they had ordered, he added:

"They all feel that the machine tool people are under terrific pressure and can't help themselves. They build better tools than anyone else in the world and so naturally everybody wants them."

Secretary Morgenthau also stated that both the engine plants mentioned and the Glenn L. Martin Co., at Baltimore, which he had visited previously, had required foreign buyers to pay in advance for the plant and equipment needed to fill their orders, and that he thought the procedure a good one. The 50 per cent expansion of Pratt & Whitney and Wright to meet the foreign orders he described as the largest industrial expansion that has taken place in this country in many years.

Deliveries to Be Advanced

From other sources, it is indicated that deliveries of machines now on order from the aircraft engine plants have been promised between April 1 and July 1. Considerable improvement is expected in these deliveries. New business which has been quoted generally on a six months' delivery basis will probably be shipped the aircraft companies within three months.

The discussion at Washington indicated that plant expansion of the machine tool industry is also involved in the current plans. In this connection, representatives of the industry have discussed with Treasury officials what special tax agreements for depreciation and obsolescence allowance on the new facilities can be worked out with the Treasury. This is one of the major problems of the aircraft industry, also particularly in connection with the writing off of equipment used in the production of war orders. Instances have already been cited where the Treasury Department has permitted the writing off of special tools and equipment over the length of the contracts.

Argetsinger Sees Slight Business Gains in 1940

YOUNGSTOWN — Average business during 1940 will be slightly ahead of 1939 despite the current letup from the high rate of activity experienced during the fourth quarter, J. C. Argetsinger, vice president and general counsel of the Youngstown Sheet & Tube Co., predicted here recently in an address before the Exchange Club. The 1940 average, however, will be below the 1937 level, he added.

Cuyahoga River Straightening Will Cut Ore Unloading Time

CLEVELAND — Straightening of the twisted Cuyahoga River here, begun quietly in 1938 after years and years of discussion, has reached the point where vessels attempting to reach up-river steel plants will benefit during the coming Great Lakes navigation season.

The plan for improving the crooked river provides for widening the navigation channel at critical places, cutting back the points and easing the principal bends, together with the rebuilding of a number of old narrow bridges, in order that vessels 635 ft. long with 70-ft. beam can safely and with reasonable speed navigate the river.

Steel towers for three of the new highway bridges made necessary will be completed within the next few weeks. Lift spans over the river are being erected.

Cost Under $14,000,000

George B. Sowers is consulting engineer in charge of the improvement, which follows a study and report made by Gen. Charles Keller, retired, in 1929. The city plan was adopted in January, 1931, and approved by the Secretary of War in March, 1931. Congressional authority for Federal aid was given in August, 1937.

The cost for the entire project is estimated to be $13,781,417.

The channel widening is divided into nine cuts for the most part on the inside of the curves and bends.

The channel will be generally not less than 200 ft. wide on the straighter reaches where boats do not customarily tie up at the docks and 250 ft. wide where the principal unloading docks are located. The width around all bends has been planned to pass the 635-ft. by 70-ft. beam ore boats easily, and without requiring that boats moored to docks be moved. Two basins for turning boats around are provided for on the present length of channel and a third is planned at the upper end of the channel extension.

Financed Through Bonds

The city's portion of the cost for the improvement is being provided through the sale of $3,075,000 worth of bonds which were authorized by vote of the people in 1930, but which had been held by court litigation until the legislative authority had expired.

The first contract for the construction work was awarded in Nov. 2, 1938, and actual construction was begun on Nov. 9, 1938, or more than a week before the starting time specified in the PWA grant.

The lift span machinery is being built at the plant of the Wellman Engineering Co., Cleveland, and is largely completed, ready for installation. The electrical work is being built by the Dingle-Clark Co., Cleveland. The three new highway bridges, replacing three very old, obsolete and inadequate bridges, will be completed and in service about June 1940, as scheduled.

The construction of the three new bridges involves the following approximate amounts of steel:

Columbus Road Bridge	1,800 tons
Carter Bridge	2,300 tons
Upper West Third Street Bridge	1,800 tons
Total	5,900 tons

Approximately 5500 tons of steel have been used in completed bulkheads and an additional 1500 tons of steel will be used in the bulkheads under contract. Contracts for bulkheads and underpinning of bridges will probably require an additional 5500 tons of steel.

The new widened channel, fast operating bridges, together with the widening of the channels and cutting back of the bends should make it possible for the boats to save from one to three hours' time in a trip up the river.

$10,947,250 Earned by Inland Steel in 1939

INLAND STEEL CO. reported net income for 1939 of $10,947,250 compared with $4,916,203 in 1938. Net income for the three months ended Dec. 31, 1939, was $4,574,440, the largest profit for any three month period since the March quarter of 1937. Inland earned $6.74 per share last year. Ingot production in the fourth quarter was at the rate of 102 per cent of theoretical capacity, operations for the year averaging 77 per cent.

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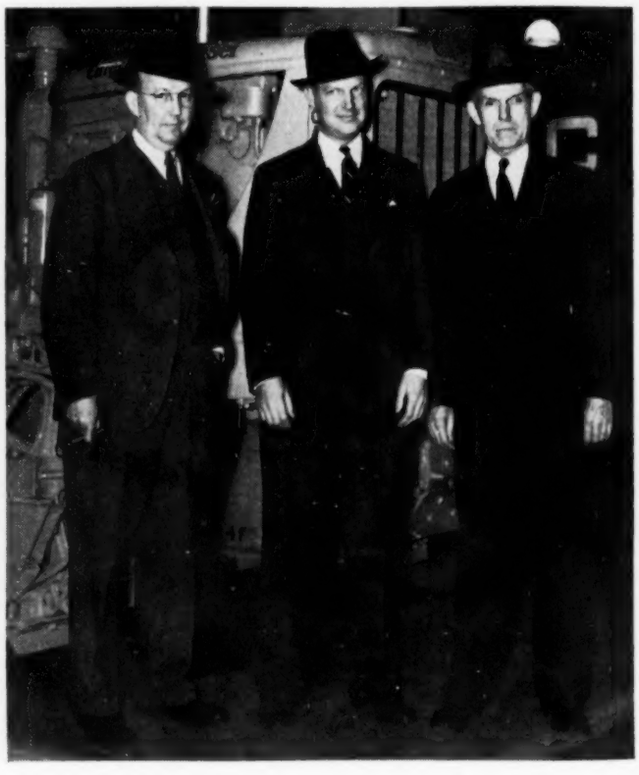
Steel Men at Road Show

J. L. PERRY, president of the Carnegie-Illinois Steel Corp., (at right) at the National Road Show in Chicago, accompanied by G. A. Price (center), district manager in Chicago for Carnegie-Illinois, and G. O. With, of the Chicago sales office. They had been inspecting the exhibit of the Caterpillar Tractor Co.



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Steel Co. of Canada To Make Tin Plate

TORONTO—The Steel Co. of Canada, Ltd., Hamilton, Ont., announce the purchase of an eight-acre industrial site on which will be erected a tin plate mill at an estimated cost of $1,000,000. Officials state that "under an arrangement with the principal users of tin plate in Canada it is proposed to proceed at once with the installation of a tin plate dipping plant with storage facilities for both black and tin plate. Proposals also are being considered for the immediate installation of a future hot mill." This latest development in the company's enlargement plan, which when carried out over possibly a period of years, is part of the expenditure totaling about $15,000,000 reported at the annual meeting last year.

Ross H. McMaster, president of the Steel Co. of Canada, states in a report to shareholders: "Your company starts the year with a substantial backlog of unfilled orders and production continues at full capacity. The ultimate consumption of steel products has been considerably below the rate of production during the recent months. Prospects for the current year are encouraging, but will depend largely upon the extent to which war requirements may engage the Canadian steel facilities. So far the use of your company's products for such purposes has been extremely limited. The new open hearth furnace, construction of which was started early in September, came into production before the close of the year."

Canadian Machine Tool Plants At Capacity; Imports Up

TORONTO—Demand for machinery and machine tools is responsible for capacity production by practically all Canadian makers, and in addition imports from the United States and Great Britain have reached almost record proportions in the past two or three months. While much of the demand is for production of war supplies of various kinds, sales also are heavy for ordinary peace time activities. New business in the machinery and machine tool lines is of a widely diversified nature and inquiries are appearing in increasing number in connection with plant additions and new plants in many parts of the Dominion, while at the same time there has been extensive replacement demand due to discarding of obsolete or worn out tools for more efficient equipment. While much of the demand is for new equipment, there has been heavy demand for used tools and it is stated that there is comparatively little in the way of rebuilt or used tools on the market in this country.

Canadian Shipyards Get War Contracts

TORONTO—In connection with the shipbuilding program announced by Canadian government officials, which will include 46 anti-submarine boats of the "whale-catcher" type, a number of contracts have been placed. Canadian shipbuilding companies that have been awarded contracts to date are Davie Shipbuilding Co., Lauzon, Que., subsidiary of Canada Steamship Lines, to build 10 ships; Canadian Vickers, Ltd., Montreal, eight; Marine Industries, Sorel, Que., seven; Morton Engineering Co., Quebec, Que., six. Ontario companies also have received contracts, including the Port Arthur Shipbuilding Co., Port Arthur, Ont., which has an order for eight ships. The Collingwood Shipyards, Ltd., Collingwood, Ont., also has orders for construction of several vessels of this type, and while the exact number has not been made public, it is said to be between six and eight. Other contracts will be placed immediately with other Canadian shipbuilders, including George T. Daple & Son, Levis, Que., the St. John (N. B.) Dry Dock & Shipbuilding Co.; Halifax Shipyards, Ltd., Halifax, N. S., and three shipbuilding companies on the Pacific Coast. The ships of the "whale-catcher" type will cost from $400,000 to $600,000 each fully equipped.

Bids have been closed for 28 trawlers or mine-sweepers of large standard type, which will cost about $400,000 each or total around $11,000,000. Contracts placed and those in prospect will provide sufficient business to keep all Canadian shipyards running at full time for more than a year.

Imports of Metal Working Machinery into Canada, December, 1939

Classification	United States	United Kingdom	Total All Countries
Drilling and boring machines	$49,073	$87	$49,160
Grinding machines	43,770	6,026	49,796
Lathes	90,649	1,297	92,068
Milling machines	79,338	119	80,750
Planers	....	....	....
Presses	16,631	....	16,631
Rolling mill machines	56,240	....	56,240
Shapers and slotters	16,698	....	16,698
Not otherwise listed	274,178	4,859	280,777
Grand Totals	$626,577	$12,388	$642,120

Source: Dominion Bureau of Statistics.

Union Walkout Ends At Aliquippa Plant

PITTSBURGH.—Installation of a new combination tonnage rate system on which proper notification to union officials was made, resulted in a walkout of some union employees which forced a cessation of work by approximately 200 workmen at Jones & Laughlin Steel Corp.'s Aliquippa tin plate temper pass mill department early this week.

The walkout, which constituted a violation of the union's agreement with the company, was short lived, the men returning to work at the new rate with the matter to be taken up in the routine manner as set forth in the agreement between company and the SWOC.

Court to Review Decision On Steel Wage Minimum

WASHINGTON—Complying with the Government's petition for review on a writ of certiorari, the Supreme Court on Monday agreed to review the decision of the Circuit Court of Appeals for the District of Columbia, which held last October that the Department of Labor exceeded its authority and misinterpreted the term "locality" in the Walsh-Healey Public Contracts Act when it made its minimum steel wage determination in November, 1938.

Counsel for the Lukens Steel Co., and six other small Eastern steel mills had opposed the Supreme Court review.

The steel wage determination, which provided for minimum wage rates ranging from 62½c. to 45c. but which recognized no wage differential between Eastern mills and plants in Pittsburgh, Youngstown, and Chicago, has been inoperative by court injunction since March 1939.

The Edgcomb Steel Corp., 350 Frelinghuysen Avenue, Newark, N. J., has been appointed distributer of seamless stainless steel pipe and tubing for Globe Stainless Tube Co., Milwaukee.

New Deal "Tinkering" U. S. Toward Ruin, 10 AFL Leaders Declare

INCESSANT "tinkering" by the New Deal has failed to solve the nation's economic problems and one tragic result of its seven years of experimentation has been a widespread destruction of confidence, 10 prominent AFL leaders said this week.

In establishing the "growing dominion of the Federal Government over the American people" the New Deal has divided labor, dislocated the country's finances, left the country with 10,000,000 unemployed, embittered relations between employers and employees and lifted the public debt by $40,000,000,000, they said.

While William Green, AFL president, recently presented President Roosevelt a birthday cake, other AFL leaders, including William Hutchinson, president, the International Brotherhood of Carpenters, and Matthew Woll, AFL vice-president, now charge the Administration with:

"1—Tinkering with the hours and wages of labor under the NRA.

"2—Tinkering with the cost of labors' food under the AAA.

"3—Tinkering with property rights in the confiscation of private gold savings.

"4—Tinkering with the foundations of American Government in the attack on the Supreme Court."

The 10 labor leaders, whose attack followed recent criticism of the New Deal by John L. Lewis, head of the CIO, pointed to the steel industry's tax burden. They said:

"In 1929 steel taxes represented 14c. per dollar of wages paid. In 1938 wages equaled 21c. per dollar. In 1929 steel taxes represented $2.91 per ton of finished steel produced. In 1938 steel taxes represented $5.18 per ton.

'To succeed," the AFL officers said, "industry needs ample and continued financing, satisfactory supplies of raw material, satisfied labor, adequate transportation, public confidence, reasonable taxation and profits. All these factors have been latent in the American economy for the past seven years, and yet, for reasons that are known to all who deal with industry, they have not been permitted to function."

Few New Deal activities were ignored by the AFL group which told its followers that: "The hour has come for Americans to recognize the dangers that confront them, and to join in a united effort to halt the drift toward national insolvency and industrial collapse, and to extend opportunity for the Americans of today and tomorrow."

5 NLRB Elections at U. S. Pipe & Foundry

WASHINGTON—Conflict between the AFL and CIO over collective bargaining representation at the plant of the United States Pipe & Foundry Co., Bessemer, Ala., is to be settled by five separate elections ordered by the National Labor Relations Board. The CIO-Amalgamated Association of Iron, Steel and Tin Workers, through the SWOC, contends that all production and maintenance employees constitute a unit appropriate for the purpose of collective bargaining. Five AFL craft units contend that separate bargaining units should be established along craft lines. The board ruled that the production and maintenance employees could be considered either as a single unit or as five separate units and said that the determining factor should be the desires of the employees themselves and on Tuesday of last week ordered that elections be held within 30 days.

The board announced last Wednesday that an election would be held within 30 days among the production and maintenance employees of R. K. LeBlond Machine Tool Co. and Cincinnati Electrical Tool Co., Cincinnati, to determine whether they desire to be represented by Independent Employees Organization, by the Amalgamated or by neither.

Upon the basis of a stipulation the board has announced an order requiring National Steel Equipment Co., Philadelphia, to disestablish the National Union of Philadelphia as the collective bargaining agency for any of its employees.

The board has announced certification of SWOC Lodge No. 1060 of Amalgamated Association as the sole collective bargaining agency selected by a majority of the production and maintenance employees of Wickwire Spencer Steel Co., Tonawanda, N. Y., following an election resulting in a count of 785 for the CIO affiliate, 355 for Federated Industrial Union, Wickwire, Local No. 1060 of Federated Industrial Union, and 28 votes for neither.

Having been advised by AFL's International moulders Union Local 177, that it does not desire to participate in an election among certain employees of Borg-Warner Corp., Muncie Foundry Division, Muncie, Ind., the board has amended its Jan. 16 direction of election by striking the union's name from the ballot to be used in the election.

L. N. Shannon Nominated President of A.F.A.

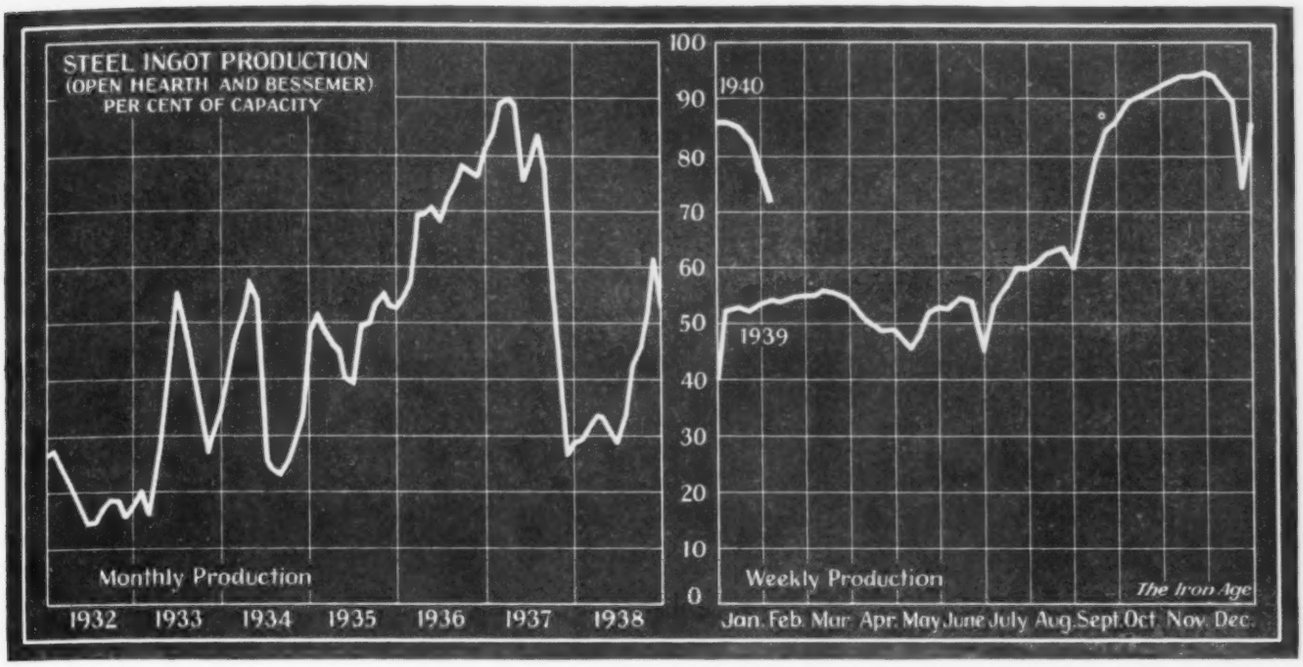
L. N. Shannon, vice-president and works manager, Stockham Pipe Fittings Co., Birmingham, and present vice-president of the American Foundrymen's Association, was nominated for the presidency of the association at a recent meeting of the nominating committee. Herbert S. Simpson, president, National Engineering Co., Chicago, and a past director of the association, was nominated for vice-president.

Directors nominated to serve three-year terms were: Henry S. Washburn, president, Plainville Casting Co., Plainville, Conn.; George W. Cannon, vice-president, Campbell, Wyatt and Cannon Foundry Co., Muskegon, Mich.; L. P. Robinson, sales manager, Werner G. Smith Co., Cleveland; Harold J. Roast, vice-president, Canadian Bronze Co., Montreal, Canada, and B. D. Claffey, Gray Iron Division, General Malleable Corp., Waukesha, Wis.

Monthly Inventory Reports May Be Broken Down

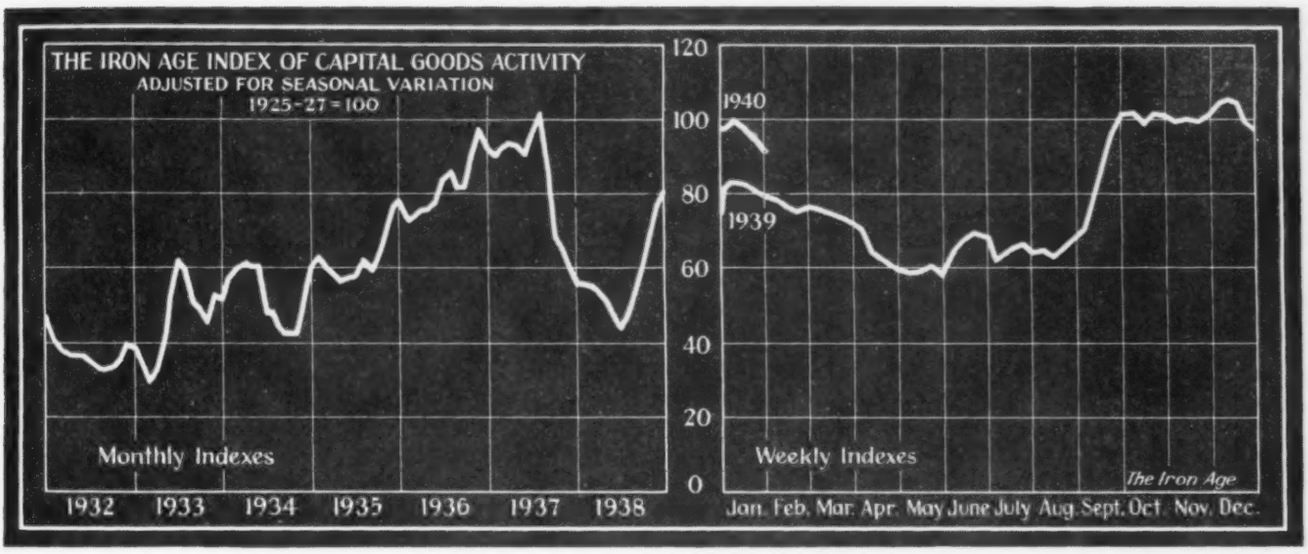
WASHINGTON — Present plans of the Department of Commerce in its first effort to establish monthly reports on industrial inventories propose an overall composite picture by values only. Tentative consideration, however, is being given to gathering data by segregated industries, including steel, to show quantities on hand at both producing and consuming sources. It was conceded that the undertaking would be extremely complicated as it applies to such industries as steel with its large variety of products. It would be done, if at all, by a sampling process rather than by sending out questionnaires to all producers and consumers.

Ingot Rate Drops Five and One-Half Points to 71½% of Capacity


STEEL INGOT PRODUCTION
(OPEN HEARTH AND BESSEMER)
PER CENT OF CAPACITY
Monthly Production
1932 1933 1934 1935 1936 1937 1938
1940
1939
Weekly Production
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
100 90 80 70 60 50 40 30 20 10 0

District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	69.0	75.0	49.0	81.0	69.0	61.5	80.0	96.0	88.0	61.5	87.5	71.0	90.0	**71.5**
PREVIOUS WEEK..	73.0	85.5	62.0	82.0	75.0	61.5	80.0	98.0	94.0	75.5	85.0	68.5	90.0	**77.0**

Index Lower for Third Consecutive Week


THE IRON AGE INDEX OF CAPITAL GOODS ACTIVITY
ADJUSTED FOR SEASONAL VARIATION
1925-27 = 100
Monthly Indexes
1932 1933 1934 1935 1936 1937 1938
1940
1939
Weekly Indexes
The Iron Age
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
120 100 80 60 40 20 0

WITH the lone exception of the construction factor, all components of THE IRON AGE index of capital goods activity declined in the past week, marking the third consecutive weekly loss from the year's highpoint of 100 recorded in the period ended Jan. 13. The week's drop totaling five points, brought the index down to 89.5 per cent of the base years. The continued easing of physical output in the steel and automobile industries, in face of a normally rising trend at this time, caused particularly sharp decreases in both these factors. The cold weather, which seriously hampered river shipments, was partially responsible for the loss in the Pittsburgh series. The week's volume of heavy construction contracts placed was triple the previous week's abnormally low figure and 6 per cent above the comparable week of a year ago. Private awards in the week exceeded the volume of public awards for the first time since last October, due largely to the awarding of a $15,000,000-contract for a new copper smelting plant for Phelps Dodge Corp. at Morenci, Ariz.

	Week Ended Feb. 3	Week Ended Jan. 27	Comparable Week 1939	Comparable Week 1929
Steel ingot production[1]	104.2	112.7	80.2	117.4
Automobile production[2]	107.9	113.9	84.5	137.6
Construction contracts[3]	69.8	68.2	103.8	127.3
Forest products carloadings[4]	56.6	64.6	56.9	120.3
Production and shipments, Pittsburgh District[5]	109.0	113.3*	71.0	117.7
Combined index	**89.5**	**94.5***	**79.3**	**124.1**

*Revised.

Sources: [1] THE IRON AGE; [2] Ward's Automotive Reports; [3] *Engineering News-Record*; [4] Association of American Railroads; [5] University of Pittsburgh. The indexes of forest products carloadings and activity in the Pittsburgh area reflect conditions as of the week ending Jan. 27. Other indexes cover the week of Feb. 3.

. . . SUMMARY OF THE WEEK . . .

. . . Ingot production declines sharply; Youngstown District down to 49 per cent.

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. . . Rate for industry at 71½ per cent, but incoming business is not supporting it.

o o c

. . . Steel and pig iron prices firm; scrap price trend still downward.

WITH dwindling backlogs and no improvement in the volume of new business, steel companies have reduced operations again this week. The decline in the average rate for the industry is five and a half points to 71½ per cent, which makes a loss of 10½ points from a fortnight ago.

In some districts, however, the curtailment of operations is more drastic than the decline for the industry as a whole would indicate. On a percentage basis, the sharpest drops were in Southern Ohio, which went off 14 points to 61½ per cent, and in the Youngstown district, which is 13 points down at 49 per cent, by far the lowest rate in the country. The Chicago district has dropped 10½ points to 75 per cent, Pittsburgh is off four points to 69 per cent, Cleveland-Lorain is six points lower at 69 per cent, and the Birmingham district, where operations were steady during January, has dropped six points to 88 per cent. There have been moderate gains in the St. Louis and Western districts, but these are of no significance on a tonnage basis.

A continuance of the decline is probable until production and incoming tonnage are in closer alinement. New orders in the past week are estimated as approximately equal to not more than 45 per cent of capacity. The excess of current production over new business is, of course, accounted for by backlog tonnage, which is still quite large in some products, notably rails and track accessories, while in some other products it has almost entirely disappeared.

Ingot output in January, amounting to 5,017,588 gross tons, was only moderately below that of December and was the fourth consecutive total of more than 5,000,000 tons in a month. The average operating rate last month was 83.18 per cent.

ACCOMPANYING the declining volume of steel production there has been a corresponding reduction in pig iron activity. On Feb. 1 the number of furnaces in blast was 177, a loss of 14 from the 191 that were active on Jan. 1. Production of coke pig iron in January totaled 3,600,020 gross tons compared with 3,768,336 tons in December. This was a decline of 4½ per cent calculated on the daily basis of 116,126 tons last month against 121,559 tons in December. Twelve steel company furnaces went out and one went in and three merchant furnaces discontinued operations. Since Feb. 1 a few additional furnaces have gone out.

The downward trend of scrap prices continues to reflect the uncertain outlook for steel. A decline of 50c. at Pittsburgh and one of 25c. at Chicago bring THE IRON AGE scrap composite price down to $17.08 from $17.33 last week. A year ago scrap began to show moderate signs of strength by mid-February.

While the falling off in new business, which has been in evidence since November, but more noticeably since the holiday period, appears to have halted, there is as yet no indication of a reversal of trend. Steel companies estimate that several more weeks may be needed to bring about an approximate balance of new business and production at a rate below the current level. Some consumers of steel are buying on a hand-to-mouth basis and others are remaining out of the market until present inventories are depleted.

THERE is an air of expectancy among buyers with regard to the price situation, but steel companies, still mindful of the price break of May, 1939, and its consequences, are on guard against a repetition of that occurrence. Where prices have been subject to a real test, buyers have found quotations firm. There is as yet no well-founded basis for the conclusions arrived at in some quarters that the recent widely publicized iron ore sale is a forerunner of price changes in either pig iron or finished steel. Such price irregularities as at present exist are chiefly in secondary markets.

With the approach of spring and with the gradual depletion of consumer inventories carried over from the fourth quarter, it is believed in the trade that new buying will expand moderately, though the change may not be in evidence for some weeks. Fabricated structural steel, which has been in winter doldrums, has expanded this week with lettings of 28,900 tons, double the previous week's total, while reinforcing bar lettings were 13,100 tons, also an improvement over recent weekly totals.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Feb. 6, 1940	Jan. 30, 1940	Jan. 9, 1940	Feb. 7, 1939
Rails, heavy, at mill	$40.00	$40.00	$40.00	$40.00
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point.	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 5 to 9/32 in., Pittsburgh, Chicago, Cleveland, cents per lb.	2.00	2.00	2.00	1.92
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Alloy bars: Pittsburgh, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.10	2.10	2.10	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.10	2.10	2.10	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.55	2.55	2.55	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Barbed wire, galv.: Pittsburgh, Chicago, Cleveland, Birmingham	†3.40	3.40	3.40	3.20
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	$5.00

†Applies to 80-rod spools only.

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese, seab'd carlots	100.00	100.00	100.00	80.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	*$17.75*	$18.25	$18.25	$15.625
Heavy melting steel, Phila.	17.50	17.50	18.25	15.25
Heavy melting steel, Ch'go.	*16.00*	16.25	16.50	13.75
Carwheels, Chicago	*16.50*	16.75	15.75	12.50
Carwheels, Philadelphia	20.25	20.25	20.25	16.75
No. 1 cast, Pittsburgh	18.75	18.75	19.25	15.50
No. 1 cast, Philadelphia	20.25	20.25	20.25	16.75
No. 1 cast, Ch'go (net ton).	*14.00*	14.25	14.25	12.75

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.50	$3.75
Foundry coke, prompt	5.50	5.50	5.50	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Copper, Electrolytic, Conn.	11.625	11.625	12.50	11.25
Copper, Lake, New York	*11.625*	12.00	12.50	11.375
Tin (Straits), New York	*45.125*	45.875	48.25	45.75
Zinc, East St. Louis	5.50	5.50	5.75	4.50
Zinc, New York	5.89	5.89	6.14	4.89
Lead, St. Louis	5.10	5.10	5.35	4.70
Lead, New York	5.25	5.25	5.50	4.85
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Feb. 6, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$17.08 a Gross Ton
One week ago	2.261	22.61	17.33
One month ago	2.261	22.61	17.67
One year ago	2.286	20.61	14.875

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	$22.50, Oct. 3	$14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.192c., Dec. 11	2.131c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 9

. . . THIS WEEK'S MARKET NEWS . . .

STEEL OPERATIONS

. . . Rate for industry declines five and a half points to 71½ per cent

INGOT production has dropped sharply for the second week. This week's decline is five and a half points to 71½ per cent. Thus the present rate is 10½ points below that of two weeks ago.

There was a decline of four points at PITTSBURGH to 69 per cent, one of 10½ points to 75 per cent at CHICAGO, while a still greater drop has occurred in the YOUNGSTOWN district, where the rate is now only 49 per cent, off 13 points from last week. The CLEVELAND-LORAIN rate is down six points to 69 per cent. SOUTHERN OHIO has also dropped sharply to 61½ per cent. In the BIRMINGHAM district, where operations were steady during January, there has been a decline from 94 per cent to 88 per cent.

NEW BUSINESS

. . . Incoming orders at Pittsburgh equal to 40 to 45% ingot rate

WITH no indication as to whether it is significant as a reversal of the downward trend, the falling off in new steel business at PITTSBURGH had halted in the past week, with the total volume of specifications practically unchanged from the previous week. Incoming orders were heavy enough to support an ingot rate ranging from 40 to 45 per cent of capacity, the difference between this and the current operating rate being made up by the reduction of backlogs.

Although unfilled tonnage has declined substantially from early December, actual backlogs today are still in excess of those which existed previous to the declaration of war in Europe. If no increase in the present rate of business materializes, however, before the middle of March, the larger part of steel backlogs will have been dissipated and buying as well as operations by that time should approximate a strictly hand-to-mouth condition.

Flat rolled steel purchases by Ford Motor Co. were to have been made early this week and, since they were to have involved cut lengths, the recent $2 a ton coil extra is not involved.

New orders at CHICAGO are being received at a low and disappointing rate. It is only occasionally that a day's bookings will total as much as 50 per cent of that day's shipments. Though the immediate future seems to hold little important tonnage in prospect other than possible purchases by the automobile industry, CHICAGO sellers are not entirely without optimism. Many feel that the inventories of steel upon which most consumers have been living these past few weeks are being depleted, and that something more than the current fill-in business may be expected soon.

A good tonnage of rails and other steel products for railroad car construction is on order and will be rolled and shipped over the next few months. The inquiries for thousands of additional cars, which prior to Jan. 1 were expected to have developed by this time, have not yet been seen. Production of farm tractors and farm implements continues at a high rate. Some companies are finding it difficult to supply dealers with floor models of tractors, so great is the consumer demand. Implements are being manufactured now and held in stock awaiting the spring orders.

Receipt of numerous modest steel orders at CLEVELAND and YOUNGSTOWN since Feb. 1 indicates good operations on the part of many small manufacturing firms which either do not have large inventories or do not feel hesitant over the outlook. With the larger steel consumers remaining on the sidelines, however, aggregate incoming tonnage for steel mills has been low.

Order backlogs of alloy steel divisions are buoying up electric furnace production in Ohio, contrary to the downward trend in open hearth activity.

Bar mills in the CLEVELAND and YOUNGSTOWN areas are enabled to devote more time to the production of special sections. As some of these sections require as high as five hot mill passes and five cold draws, with an anneal in between, production was hampered during the period of overcrowded schedules which prevailed until recently.

A small amount of replacement buying of bars and plates by warehouses, some moderate export bookings of ship plates, and the usual miscellaneous demand is maintaining new business in EASTERN PENNSYLVANIA at a rate equal to about 50 per cent of capacity. As backlogs of plate mills in that area are practically non-existent, operating rates in steel making and finishing departments are dependent entirely upon current sales. A district plate producer has estimated that rolling for export shipment is accounting for 20 percentage points of the present operating rate and without this export, new business would be equal to about 30 per cent of capacity. Awarding of contracts to Canadian shipyards for the construction of anti-submarine boats is expected to result in the purchase of about 2000 tons of hull plates in the East. The E. W. Budd Mfg. Co. has placed its first quarter stainless requirements for the trailers it is building for the Fruehauf Trailer Co.

PRICES

. . . Quotations are generally firm . . . Test of sheets and strip expected

WHILE there is an air of expectancy among buyers with regard to the price situation, the mills are holding firmly to established quotations. Principal signs of weakness are in secondary markets, such as fabricated structural steel and reinforcing bars. A test of sheet prices is expected this week at Detroit, where a quantity of material may be bought by an automobile company. Still mindful of the price break of May, 1939, the major steel companies are on guard against a repetition of that episode.

Conclusions have been arrived at in some quarters that a sale of iron ore to the Ford Motor Co. at an undisclosed, but reportedly low price, is a forerunner of lower prices for pig iron, but pig iron producers state that such conclusions are ill-founded and they look for no reaction of this kind in the pig iron market.

PIG IRON

. . . No evidence of weakness in prices as result of ore deal

THE recent sale of iron ore by the Oliver Iron Mining Co., U. S. Steel subsidiary, to the Ford Motor Co. at an undisclosed price, reported as below the market, has had no effect on pig iron quotations, according to leading sellers. Conclusions arrived at in

some quarters that lower pig iron prices might result from this transaction are not well founded, sellers state.

Pig iron shipments at some points have been steady during the past week, but new buying is light. The volume of inquiries from abroad is a feature of the market.

Small sales to Turkey and Greece are reported in the NEW YORK district but difficulties in obtaining exchange and shipping space plus a desire of some countries to concentrate first on imports of more strategic materials than pig iron are obstacles to U. S. exporters.

Foundry coke shipments of CLEVELAND sellers continue strong this month after January showed a 10 per cent gain over December. Pig iron shipments there are easing off slowly, however. New business continues dull at PITTSBURGH with shipments running below a month ago. The lower ingot rate at PITTSBURGH portends the banking of some steel making stacks this month.

Although January shipments in PHILADELPHIA were about one-third below December, present indications are that February deliveries will at least equal the December volume. Fresh buying is still very light, consisting entirely of carlots for rounding out analyses. A few export inquiries are still circulating, but outside of the placing of 1000 tons of semi-bessemer for Scandinavian delivery, few of these proposals are materializing into actual orders. Stove makers are showing a seasonal gain in operations and hardware and soil pipe foundries are still actively engaged. For the PHILADELPHIA district as a whole, melting operations are little changed from the December rate.

The general situation at BOSTON has not changed except that furnace representatives believe the expected buying movement will start earlier than anticipated a week ago. They say that the continued high rate of foundry operations is taking yard stocks down more rapidly than has been appreciated. There is nothing to indicate the New England melt will decrease for some time to come.

The strong machine tool melt in the SOUTHERN OHIO district continues to support a steady shipment of pig iron. Melters generally, however, are not anticipating their requirements, current ordering being in small lots, not exceeding 150 tons. Furnace interests generally expect a renewal of more active buying within the next few weeks, since present shipment rates will exhaust current first quarter contracts before the close of the quarter. Seasonal influences continue to keep the stove and agricultural implement foundries on light schedules, but moderate improvement in the automotive melt is reported.

Even though new orders are fairly scarce shipments at BUFFALO are holding up and investigations have shown material to be moving into immediate consumption. Foundry operations are encouraging.

January pig iron shipments at Chicago were about on a par with those of December, while foundry coke activity increased somewhat. Little change is expected this month, though the movement of iron may be slightly less. Foundry melt is spotty but the general level held up well through January. Three blast furnaces have been banked there in recent weeks.

Carnegie Illinois will soon begin the construction of 142 new Koppers-Becker coke ovens in two batteries of 71 ovens each at Gary works to replace old equipment.

SEMI-FINISHED STEEL

. . . Buying is being done on hand-to-mouth basis

BUYING at PITTSBURGH proceeds on a strictly hand-to-mouth basis with irregular weekly sales totals. Actual specifications last week were at a slightly faster pace than the week before. Although backlogs have been reduced considerably from their high point last December, unfilled tonnage is not small. The recent purchase by Great Britain of raw steel is evidence of previous reports that Britain's steel ingot capacity is insufficient to take care of finished steel demand. Britain is expected to continue its policy of holding as many of its foreign customers as possible, regardless of war conditions.

. . . PLATES . . .

. . . Market not active but sales average about 50% of capacity

THE demand for plates is generally quite dull, but nevertheless the orders that flow in to the mills continue to average about 50 per cent of capacity.

Canadian shipyards, which have just received contracts for anti-submarine boats, may purchase about 2000 tons of plates in the United States within the near future.

The Central Iron & Steel Co., Harrisburg, Pa., has been awarded a Navy order for 1300 tons for stocks at various Navy yards.

Most of the export plate inquiry comes from shipyards in Holland and the Scandinavian countries.

REINFORCING BARS

. . . Awards 13,100 tons . . . Some soft spots in prices

REINFORCING steel awards of 13,100 tons include 3500 tons for the Grand Coulee Dam, Odair, Wash.; 2700 tons for two housing projects at New Orleans; 2200 tons for two graving docks at Pearl Harbor, Hawaii; 1100 tons at San Francisco for a housing project and 1000 tons for a hospital unit at Wilmington, Del.

Among new reinforcing projects of 3925 tons is 1365 tons for Quartermaster supplies in Brooklyn.

Soft spots in the reinforcing bar price structure continue in various parts of the country with irregularities showing up in rail bar bids.

SHEETS AND STRIP

. . . Market is drifting with new sales not improving

NO noticeable change in the sheet and strip sales picture in PITTSBURGH is expected in the near future, with the possible exception of the Ford purchase which may be made this week. Tonnage involved there will undoubtedly not be as large as at first reported and, despite previous impressions, did not specifically involve testing of the $2 coil extra. Miscellaneous buying of sheets and strip is still conspicuous by its absence. Prices are firm on major flat rolled products.

CHICAGO mills are receiving little new business. With the exception of possible buying in DETROIT soon, nothing important is in sight. It is believed, however, that the spring months will bring a resumption of buying from the general manufacturing trade. Inventories that were built up during the final quarter of 1939 are being worked down now, and it is felt that normal buying to sustain current operations will be necessary shortly. Hot rolled sheets, 18 gage and heavier, are available in CHICAGO in 10 days to two weeks.

New business at CLEVELAND has consisted principally of numerically good

small orders which may indicate larger tonnages to come later this quarter. In general the tendency of the market is to drift at present. Producers are disposed to stay firm behind the coil extra inaugurated last fall. The galvanized sheet market is quiet but may gain headway before long when Southern dealers begin their seasonal replenishment of stocks.

Sheet trade in the ST. LOUIS area is dull, as jobbers have been slow in liquidating their stocks because cold weather has held back buying by farmers.

SOUTHERN OHIO mills report that tonnage received during the past week was slightly better than during the preceding period. Weather conditions continue to hold jobbers demand to a minimum.

TUBULAR GOODS

. . . Oil country demand fairly good at Pittsburgh

TUBULAR goods sales at PITTSBURGH remain the bright spot in the steel picture on a comparative basis. With oil country stocks in the field at a low point, a better demand has been emanating from oil companies and both casing and drill pipe aggregate totals reflect additional export business. Miscellaneous line pipe demand continues at a fair level.

Aggregate orders of CLEVELAND sellers have slumped in the past 10 days. All the principal classifications including oil country goods, line pipe, and standard pipe are quieter. Producers are still building up their inventories.

MERCHANT BARS

. . . No evidence as yet that demand is expanding

THE total volume of hot rolled bar sales at PITTSBURGH the past week was no smaller than the week before, but aggregate demand is somewhat less than a month ago. Fairly prompt delivery is now being promised by mills, especially on the larger sizes. A slight pickup in specifications at PITTSBURGH is due to automobile company releases.

New business at CLEVELAND showed a slight gain recently but hardly enough tonnage was forthcoming to ascertain whether a trend had started. With backlogs lower, some mills are now engaged on profitable but time-consuming special sections which they were unable to work off during the earlier rush. On some of these sections as many as five hot mill passes and five cold draws are required. Shipments of bar mills continue to decline.

General demand, with particular emphasis being supplied by makers of automotive parts, cold drawers, jobbers and farm equipment plants, has supplied CHICAGO mills with a good backlog of bar orders. Order books are being worked down today at a rapid rate, since incoming business is not great, but delivery still requires four to six weeks at some plants.

COLD FINISHED BARS

. . . Principal support is from automotive industry

COLD finished bar demand has been given some support recently by automotive requirements. Sales to miscellaneous users have shown little or no change in volume. Prices remain firm.

STRUCTURAL STEEL

. . . Lettings nearly 29,000 tons, a sizable gain

FABRICATED structural steel lettings of 28,900 tons are more than double those in the previous week. Outstanding awards are 10,500 tons for two graving docks at Pearl Harbor, Hawaii; 3800 tons for the Central Avenue viaduct, Chicago; 1750 tons for a wind tunnel and test chamber at Wright Field, Dayton, Ohio; 1500 tons for an apartment building at 737 Park Avenue, New York; and 1000 tons for intake gates for the Bonneville Dam, Ore.

New structural steel projects advanced to 13,700 tons from 6530 tons last week. The only sizable new inquiries are 5000 tons for the Rainbow Bridge at Niagara Falls, N. Y., and 1500 tons for a bridge over Dutch Kills, in Queens, New York.

Mill backlogs of structural steel specifications have declined substantially.

New construction projects in the Middle West are not numerous and tonnage that may be expected in the immediate future is insignificant. As an example of the extreme inactivity, in the past two months not a single state letting has been advertised by Wisconsin, Minnesota or the Dakotas.

Fabricating plants in the ST. LOUIS district are reported to be down to between 20 and 30 per cent of capacity, cold weather interfering with planned building projects.

WIRE PRODUCTS

. . . Buying by merchants for spring not yet evident

WIRE makers at PITTSBURGH still note the effects of bad weather throughout the country, with no appreciable change in the volume of incoming merchant wire business. Improvement is in the offing, however, since the majority of jobbers have insufficient stocks to take care of ordinary spring demand, while many steel companies themselves find their stocks unsatisfactory. Rod and manufacturers wire business is only fair.

CLEVELAND sellers report new tonnage gaining only slowly. The poor comparison with one year ago is not as serious as it might seem when such factors as the high rate of activity during the fourth quarter of 1939, the severe cold weather and the fact that a price change was made one year ago are taken into consideration.

Orders in the CHICAGO district are not exceeding 50 per cent of production, industrial demand accounting for most of what business there is. Orders from jobbers in the rural districts are mainly for fill-in purposes, since farmers show little interest in merchant wire products until spring arrives.

The Bureau of Reclamation takes bids at El Paso, Tex., Feb. 23, for furnishing and erecting approximately 7½ miles of chain-link fence, complete with pipe posts, bracing, truss rods, 6-ft. wire fabric, gates and accessories, and with posts set in concrete footing or attached to existing bridges.

RAILROAD BUYING

. . . Locomotives outstanding in January equipment purchases

A TOTAL of 28 locomotives, 209 freight cars, five passenger-train cars and 72,942 tons of rails were purchased by domestic railroads in January, according to *Railway Age*. In addition, orders for 10 locomotives for export were reported during the month. In January, a year ago, eight locomotives, three freight cars and 47 passenger-train cars were purchased. In September, 1939, the peak of the fall equipment buying wave, 52 locomotives and 24,231 freight cars were ordered. Of the January, 1940, locomotive purchases, 24 were steam driven and four diesel-electric propelled.

Court approval has been given to the Rock Island 1940 budget of $7,-

486,000, which includes the purchase of 26,500 tons of new rail and 22,400 tons of old rails for relaying, the modernization of 10 passenger and 30 freight locomotives and the improvement of 200 freight cars. Of the 26,500 tons of new rail covered by the budget, 15,500 tons were purchased last fall for delivery this year. The remaining 10,000 tons will be bought this year.

Louisiana & Arkansas is seeking authority to sell equipment trust certificates to apply on the purchase of equipment costing $1,707,285. This figure covers 555 freight cars to be built by American Car & Foundry Co., and nine used locomotives to be purchased from Kansas City Southern Railroad.

Wabash has placed orders for one 66-hp. diesel-electric switcher with American Locomotive Co. and one with Electro-Motive Corp. Tennessee Copper Co. is seeking bids on eight dump cars and the Navy Department is inquiring for four freight cars.

WAREHOUSE BUSINESS

. . . Eastern districts experienced sales decline in January

BUYING in January in the Metropolitan New York-New Jersey area showed sharp seasonal drop from the December level, but was substantially above January, 1939. Relatively, sheet demand took the biggest slump in the month, while the call for alloys showed little change in volume. The decline in sheet buying is credited largely to the extreme weather which hampered activities on many building projects. Export interest was also at low ebb in January, but lately there have been indications of reviving export demand. Pending inquiries for tin plate and zinc sheets for shipment abroad are rather heavy, but buyers are very slow in closing on this business. Warehouse stocks at present are more than ample for existing demand, but an important increase in buying would require heavy replacement purchase by the warehouses. Mill shipments to warehouses are back to normal on most products, but some specialties are from six to eight weeks behind schedule. Prices are generally firm, except for occasional concessions on galvanized sheets.

Sales in PHILADELPHIA in January were about 25 per cent below the December volume, but February activity is expected to show a seasonal increase. The present demand has a very broad base and orders are fairly numerous, but the shortening of mill deliveries has caused a reduction in the tonnage involved in each order. Outside of reinforcing bars, which are subject to minor concessions, prices are holding closely to published levels.

CHICAGO steel warehouses in January experienced a decline of 15 to 20 per cent from December. This record is considered fairly good, however, in view of the fact that December was a peak month and that January activity was hampered considerably by heavy snow and low temperatures throughout the Middle West. An upward trend is expected this month to be continued through March.

BOLTS, NUTS AND RIVETS

. . . Automotive and export buying in fair volume

OPINION of producers of bolts, nuts and rivets at CLEVELAND is that first quarter business will average out to a good sized gain compared to one year ago, although down sharply from fourth quarter of 1939. Some customers admittedly are hesitant and inclined to wait. Specifications have been received from the automotive industry and export markets in fair volume.

TIN PLATE

. . . Operations remain at 63%
. . . Crop damage to be a factor

TIN plate operations this week are estimated at 63 per cent, unchanged from a week ago, and there is additional evidence that no further important declines are in prospect for the near future. Total specifications are better than a week ago. The serious damage to fresh fruits and vegetables because of the unseasonably cold weather in the southern parts of the country, will undoubtedly cause a far more rapid decline in the present stocks of canned fruits and vegetables than would have been thought a month ago. This condition will undoubtedly be reflected in heavier can programs later this year.

Horace T. Potts Co. in Business 125 Years

HORACE T. Potts Co., the oldest iron and steel warehouse in Philadelphia, celebrated its 125th year in the warehouse business on Feb. 3 with a birthday party attended by 200 employees and their families. The company was organized in 1815 and its management has been continuously in the hands of the Potts family. At present control of the company is vested in the fourth and fifth generations of the founder's family.

Among those given recognition at the gathering for length of continuous service were Thomas C. Potts, active head of the firm who has been associated with the company for 50 years, Harrison Potts, with 49 years of service, Patrick Holland, with 48 years. Horace M. Potts, with 46 years and M. J. Graff, with 44 years. Several women employees have been with the company for over 30 years.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Feb. 6, 1940	Jan. 30, 1940	Jan. 9, 1940	Feb. 7, 1939	1940	1939
Fabricated structural steel awards	28,900	11,400	10,625	8,000	84,000	130,350
Fabricated plate awards	1,575	360	420	1,150	23,135	25,425
Steel sheet piling awards	2,000	0	0	3,400	2,350	7,960
Reinforcing bar awards	13,100	5,530	9,700	10,550	43,045	73,970
Total Letting of Construction Steel..	45,575	17,290	20,745	23,100	152,530	237,705

FABRICATED STEEL

NORTH ATLANTIC STATES
AWARDS

1500 Tons, New York, apartment house for 737 Park Avenue Corp. to American Bridge Co., Pittsburgh.

850 Tons, Coney Island, N. Y., sewage treatment works buildings, contract No. 4, to American Bridge Co., Pittsburgh.

850 Tons, Philadelphia, aeronautical laboratory and office building, to Bethlehem Steel Co., Bethlehem, Pa.

420 Tons, Amcelle, Md., building extension for Celanese Corp. of America, to Bethlehem Steel Co., Bethlehem, Pa.

330 Tons, East Pittsburgh, warehouse for Westinghouse Electric & Mfg. Co., to Ingalls Iron Works Co., Birmingham.

260 Tons, Pittsburgh, housing project, to Pittsburgh-Des Moines Steel Co., Pittsburgh, through Hunkin-Conkey Construction Co., Cleveland. (Also 550 tons, plain material, to Carnegie-Illinois Steel Corp.)

180 Tons, East End, Pittsburgh, store No. 196, to Keystone Engineering Co., Pittsburgh.

180 Tons, New Paltz, N. Y., bridge, No. 135, to Bethlehem Steel Co., Bethlehem, Pa.

150 Tons, Niagara Falls, N. Y., manufacturing building for American Sales Book Co., to Austin Co., Cleveland..

140 Tons, Woodbridge, N. J., State bridges, route 35, section 14-B, to American Bridge Co., Pittsburgh.

120 Tons, Philadelphia, theater for Northeastern Theaters, Inc., to Bethlehem Steel Co., Bethlehem, Pa.

SOUTH AND SOUTHWEST

320 Tons, New Orleans, laboratory and solvents storage building, to Jones & Laughlin Steel Corp., Pittsburgh.

240 Tons, Williamson County, Tex., bridge FAGH-10 (4), 90 tons to North Texas Iron & Steel Co., Fort Worth, Tex.; 150 tons to Virginia Bridge Co., Roanoke, Va.

200 Tons, Richmond, Va., addition to Sprunance plant, E. I. du Pont de Nemours & Co., to Belmont Iron Works, Philadelphia.

180 Tons, Lockport, bridge 1333, to an unnamed fabricator.

110 Tons, Okmulgee County, Okla., bridge FAGH 53-ABC, to Patterson Steel Co., Tulsa, Okla.

CENTRAL STATES

3800 Tons, Chicago, Central Avenue viaduct, to Bethlehem Steel Co., Bethlehem, Pa.

1750 Tons Dayton, Ohio wind tunnel and test chamber for War Department at Wright Field, to R. C. Mahon Co. Detroit, through National Concrete Fireproofing Co., Cleveland.

710 Tons, Terre Haute, Ind., Dresser Power Corp., power station to Vincennes Steel Co., Vincennes, Ind.

525 Tons, Toledo, Ohio, filter plant for city, to Bethlehem Steel Co., Bethlehem, Pa.

260 Tons, St. Louis, eight steel towers for lighting system for baseball park, to Stupp Brothers Bridge & Iron Co., St. Louis.

255 Tons, Greenwood, Kan., bridge 54-37-FA 393 (b) 12, to Kansas City Structural Steel Co., Kansas City, Kan.

230 Tons, Steubenville, Ohio, office building for Ohio Bell Telephone Co., to Ingalls Iron Works Co., Birmingham.

220 Tons, Tama, Iowa, bridge for Chicago & North Western Railroad Co., to Clinton Bridge Works, Clinton, Iowa.

185 Tons, Cleveland, building for Lindsay Wire Weaving Co., to Bethlehem Steel Co., Bethlehem, Pa.

175 Tons, Chicago, anchor truss State Street bridge, to American Bridge Co., Pittsburgh.

145 Tons, Terre Haute, Ind., Dresser Power Corp., stack, to Vincennes Steel Co., Vincennes, Ind.

WESTERN STATES

1000 Tons, Bonneville, Ore., intake gates for United States Engineer (Invitation 694-40-101), to Willamette Iron & Steel Co., Portland, Ore.

733 Tons, Crescent City, Cal., Smith River bridge as follows: 520 tons of fabricated shapes, to Judson-Pacific Co., San Francisco, and 213 tons of H-type bearing piles, to Bethlehem Steel Co., San Francisco, through Joseph Shaw, Oakland, Cal., contractor.

600 Tons, Sitka, Alaska, Navy base buildings divided as follows: 500 tons, to Isaacson Iron Works, Seattle, and 100 tons, to Standard Steel Fabricating Co., Seattle.

300 Tons, San Diego, Cal., bearing piles for Consolidated Aircraft plant, to Columbia Steel Co., San Francisco.

300 Tons, Coram, Cal., stop log guides, for Bureau of Reclamation, to A. J. O'Leary & Sons, Chicago.

295 Tons, Bonneville, Ore., switch structure, to Bethlehem Steel Co., San Francisco.

160 Tons, Seattle, Wash., State undercrossing, to Bethlehem Steel Co., Bethlehem, Pa.

150 Tons, Rigby, Idaho, State underpass FAGH-16-D, to American Bridge Co., Pittsburgh.

HAWAII

16600 Tons, Pearl Harbor, two graving docks (Specification 9100), to Bethlehem Steel Co., through Pacific Bridge Co., San Francisco, and Hawaiian Dredging Co., Honolulu, contractors. Tonnage divided as follows: approximately 9000 tons H-type bearing piles; 1600 tons structural shapes.

SOUTH AMERICA

135 Tons, Argentina, warehouse building for Goodyear Tire & Rubber Co., to American Bridge Co., Pittsburgh.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

5000 Tons, Niagara Falls, N. Y., Rainbow bridge; bids March 20.

1500 Tons, New York, bridge over Dutch Kills, contract No. 3.

850 Tons, New York, apartment house for Morris Brand.

770 Tons, Elkton, Md., Little Elk River state bridge.

650 Tons, State of Pennsylvania, highway projects, bid closed Feb. 16.

420 Tons, Boundbrook, N. J., chemical plant.

330 Tons, Williamsport, Pa., factory building addition for A. C. Reed Co.

250 Tons, Pittsburgh, nurses' residence for Shadyside Hospital.

200 Tons, Elmhurst, L. I., school.

200 Tons, Fairfield, Conn., bridges for New York, New Haven & Hartford Railroad.

200 Tons, Oswego, N. Y., theater building for Schine Circuit, Inc.

180 Tons, Piermont, N. Y., power house buildings for Gair Cartons, Inc.

165 Tons, Washington, Lincoln dial exchange for Bell Telephone Co.

THE SOUTH

2600 Tons, State of Oklahoma, highway bridges, increased from original estimate of 2300 tons; bids due Feb. 6.

440 Tons, Charleston, W. Va., office building for Atlas Building, Inc.

CENTRAL STATES

239 Tons, State of Illinois, three bridges; bids Feb. 16.

228 Tons, State of Missouri, seven highway bridges; bids Feb. 23.

220 Tons, Cleveland, Benedictine School for St. Andrews Abbey.

200 Tons, Cleveland, Benedictine high school. Bids are in.

110 Tons, Highland Park, Mich., garage and laundry building for Fred Sanders.

100 Tons, Chicago, factory building, Red Head Brand Co., bids in.

WESTERN STATES

530 Tons, Oregon and Washington points, substations for Bonneville power distribution; bids Feb. 19.

300 Tons, Los Angeles, bearing piles for Los Angeles River improvement, Mariposa Street to Fletcher Drive and Burbank—Western wash; bids Feb. 16.

300 Tons, Sunnyvale, Cal., Moffett Field hangar and laboratory; bids in.

FABRICATED PLATES

AWARDS

1300 Tons, Washington, stock requirements for navy yards, to Central Iron & Steel Co., Harrisburg.

275 Tons, Pascagoula, Miss., Maritime Commission, pipe for cargo vessels to National Tube Co., Pittsburgh.

PENDING PROJECTS

1800 Tons, Watts Bar Dam, Tenn., upper and lower lock gates for TVA.

130 Tons, Los Angeles, fuel oil tanks for Exeter Refining Co. and Sunset Oil Co.; permits issued.

SHEET PILING

AWARDS

2000 Tons, Pearl Harbor, T. H., two graving docks (Specification 9100), to Bethlehem Steel Co., through Pacific Bridge Co., San Francisco, and Hawaiian Dredging Co., Honolulu, contractors.

Steel Ingot Production in January 5,017,588 Tons, 83.18% of Capacity

ALTHOUGH steel ingot production in January was below that of any of the months of the fourth quarter, it remained above 5,000,000 tons, being calculated at 5,017,588 tons, which was 83.18 per cent of capacity, according to the monthly report of the American Iron and Steel Institute. This was only slightly below the December output of 5,164,420 tons, or 85.57 per cent of capacity.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Reported by Companies Which in 1936 Made 98.67 Per Cent of the Open-Hearth and 100 Per Cent of the Bessemer Ingot Production)

	Reported Production (Gross Tons)		Calculated Production All Companies		Number of	Per Cent of Capacity
1939	Open-Hearth	Bessemer	Monthly	Weekly	Weeks	
January	2,986,455	147,494	3,174,352	716,558	4.43	52.48
February	2,755,130	196,186	2,988,649	747,162	4.00	54.72
March	3,167,782	194,694	3,405,370	768,707	4.43	56.30
1st Quarter	8,909,367	538,374	9,568,371	744,041	12.86	54.49
April	2,731,451	205,771	2,974,246	693,297	4.29	50.78
May	2,715,940	170,156	2,922,875	659,791	4.43	48.32
June	2,898,552	187,478	3,125,288	728,505	4.29	53.35
2nd Quarter	8,345,945	563,405	9,022,409	693,498	13.01	50.79
1st 6 months	17,255,310	1,101,779	18,590,780	718,623	25.87	52.63
July	2,893,916	229,380	3,162,534	715,505	4.42	52.40
August	3,469,453	246,952	3,763,418	849,530	4.43	62.22
September	3,881,564	297,128	4,231,310	988,624	4.28	72.41
3rd Quarter	10,244,933	773,460	11,157,262	849,753	13.13	62.23
9 Months	27,500,243	1,875,239	29,748,042	762,770	39.00	55.86
October	4,922,070	405,000	5,393,821	1,217,567	4.43	89.17
November	4,990,388	404,556	5,462,616	1,273,337	4.29	93.26
December	4,784,214	315,402	5,164,420	1,168,421	4.42	85.57
4th Quarter	14,696,672	1,124,958	16,020,857	1,219,243	13.14	89.30
Total	42,196,915	3,000,197	45,768,899	877,808	52.14	64.29
1940						
January	4,698,893	255,102	5,017,588	1,132,638	4.43	83.18

. . NON-FERROUS . . .

. . . All copper sellers at 11.625c., Valley . . . Spelter sales only 916 tons; shipments also decline . . . Lead quiet but steady . . . World tin deliveries soar to 18,449 tons in January.

NEW YORK, Feb. 6—Outside of the elimination of the split-price in copper on Thursday, there were no changes in prices of the major non-ferrous metals during the past week. However, the uncertainty generated by the price revisions of the past three weeks continues to keep buyers very cautious and sales in the past week were very poor. Up to last Thursday, the large copper producers had been quoting 12c., Valley, against 11.625c. being quoted by the custom smelters, but shortly after the opening of bids on 300 tons of copper for the Navy, which revealed a producing interest as the low bidder at 11.53c., the mine interests announced a reduction to 11.625c. per lb., Valley. Copper and brass products were reduced to agree with the new producers' basis. Domestic demand hovered around the 1000-ton mark all week, with no real active interest in sight at any time. Foreign buyers were feeling out the market all week, but placed very little tonnage. The volume of these inquiries were placed in some quarters at as much as 2500 tons, but apparently many of the inquiries going the rounds of the market are duplicates. A small amount of February metal for export is available at 11.60c. per lb., f.a.s., but buyers' views of the market were below this level.

Zinc

The unsettled price structure and the lessening of the operating pace in a number of important spelter consuming industries, notably sheet galvanizing, kept sales at a very low level all week. Total demand for the week was 916 tons of Prime Western metal, as compared with 976 tons in the week previous. Shipments in the past week dropped to 3964 tons of all grades from 5057 tons in the preceding period. Prices are unchanged at 5.89c. per lb., New York.

Lead

There has been little response to the price reduction of Jan. 29 and demand in the past week was limited to occasional carlots for prompt shipment. With February needs about two-thirds bought and March one-quarter covered, there seems little likelihood of any important change in the buying pace for the next few weeks at least, particularly in view of the unsettled condition of non-ferrous prices in general. Quotations were unchanged all week at 5.25c. per lb., New York.

Tin

Release of January statistics revealed that world deliveries rose to the record-breaking level of 18,449 tons in the month, or almost double the monthly average of 1939. United States deliveries for the month were 9780 tons against 11,363 in December and a monthly average of about 6000 tons in 1939. These abnormally high figures are reaction to the extended "sitdown strike" of the Far Eastern producers last year and will undoubtedly decline abruptly over the next few months. The domestic market, meanwhile, continues to mark time pending the decision of the International Control Committee on second quarter quotas. The thinness of the market was reflected in the indecisive movements of prices during the week.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Jan. 31	Feb. 1	Feb. 2	Feb. 3	Feb. 5	Feb. 6
Copper, Electrolytic[1]	11.625	11.625	11.625	11.625	11.625	11.625
Copper, Lake	12.00	11.625	11.625	11.625	11.625	11.625
Tin, Straits, New York	45.75	45.50	45.00	....	45.25	45.125
Zinc, East St. Louis[2]	5.50	5.50	5.50	5.50	5.50	5.50
Lead, St. Louis[3]	5.10	5.10	5.10	5.10	5.10	5.10

[1] Delivered Conn. Valley. Deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits, pig	46.25c.	48.00c.
Copper, Lake	13.25c.	12.75c.
Copper, electro	12.75c.	12.75c.
Copper, castings	12.375c.	12.375c.
*Copper sheets, hot-rolled	20.25c.	20.25c.
*Yellow brass sheets	18.40c.	18.40c.
*Seamless brass tubes	21.15c.	21.15c.
*Seamless copper tubes	20.75c.	20.75c.
*Yellow brass rods	14.34c.	14.34c.
Zinc slabs	6.85c.	7.50c.
Zinc sheets, No. 9 casks	12.00c.	13.35c.
Lead, American pig	6.25c.	5.75c.
Lead, bar	8.70c.	8.50c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ½	28.50c.	28.125c.
Babbitt metal, anti-friction grade	27.50c.	20.00c.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.375c.	10.00c.
Copper, hvy. and wire	8.375c.	8.75c.
Copper, light and bottoms	7.375c.	7.875c.
Brass, heavy	5.125c.	5.625c.
Brass, light	4.25c.	5.00c.
Heavy machine composition	7.375c.	8.00c.
No. 1 yel. brass turnings	5.00c.	5.375c.
No. 1 red brass or compos. turnings	7.00c.	7.50c.
Lead, heavy	4.25c.	4.625c.
Cast aluminum	8.00c.	9.00c.
Sheet aluminum	13.75c.	14.75c.
Zinc	2.875c.	4.125c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, nominally, $180 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 12.25c. a lb.

January Average Prices

The average prices of the major non-ferrous metals in January, based on quotations appearing in THE IRON AGE, were as follows:

	Per Lb.
Electrolytic copper, Conn. Valley	12.22c.
Lake copper, Eastern delivery	12.33c.
Straits tin, spot, New York	46.73c.
Zinc, East St. Louis	5.64c.
Zinc, New York	6.03c.
Lead, St. Louis	5.32c.
Lead, New York	5.47c.

IRON AND STEEL SCRAP

. . . Inactivity develops further softness in district markets
. . . Composite price down 25c. to $17.08.

FEB. 6—The lack of mill interest in buying throughout the country is reflected in further softness in most markets as reflected by a decline of 25c. in the composite price for No. 1 steel, the sharpest drop to be recorded from week to week since early December. The composite price has dropped only 59c. in value, however, from the figure of $17.67 that prevailed for four weeks around the first of the year. Chief factor in the current drop is the softness at Pittsburgh, where quoted prices are off 50c. based on very limited mill transactions and recent railroad scrap sales. On the basis of broker coverages at Chicago, the whole list is off 25c. there, while at Philadelphia the market is marking time, with only one mill actively in the market.

Although no mill purchases are reported, the market fell off 50c. at Buffalo this week, and dealers at St. Louis and Boston have lowered their buying prices 50c. There has been a sale of 5000 tons of No. 2 heavy melting steel at St. Louis, but the market is weaker there and dealers have lowered buying prices 25c. because of the prospects of milder weather releasing shipments to this area.

Shipments abroad increased last month and more boats are in sight. The export market is well stabilized at the present time, however, and no disturbing influences are looked for.

Pittsburgh

The scrap market is softer than a week ago and, although material is not plentiful, brokers who were unable recently to pick up No. 1 heavy melting at $18 a ton are now buying occasional cars at $17.50. A very small tonnage of No. 1 was sold into consumption in the past week at less than $18 a ton. No. 1 heavy melting is quoted this week at $17.50 to $18, down 50c. a ton from last week. Lower prices for railroad melting have also affected the No. 1 market. For this week at least, railroad heavy melting is quoted at $18.50 to $19, representing transactions which have taken place here this week. Because of completion of an old order, quotations on mixed borings and turnings and cast iron borings are nominal and next sales may be made to brokers for yard accumulations at somewhat less than the current nominal quotation.

Chicago

This market is experiencing a period of absolute inactivity. Several weeks have elapsed since the last mill sale at $16.50, and from present indications it may be at least that long again before another important sale will be made. Brokers are buying heavy melting steel without difficulty at $15.75, and $16 as a buying price has disappeared. Mill operations here have decreased sharply in the past two weeks. On the basis of broker dealer transactions No. 1 steel is quoted nominally this week at $15.75 to $16.25. Other prices are down a nominal 25c. a ton in sympathy.

Philadelphia

The market here is marking time. Outside of a mill in the Harrisburg area, consumers are showing little interest in making new commitments. About 4000 tons of Budd bundles went at around $17, f.o.b., or $17.50 delivered, to a local mill. The heavy melting steel on the January Pennsylvania list went at about $19, delivered in the Harrisburg area. Small lots of No. 1 and No. 2 steel were purchased by a district mill in the past week at $17.50 and $16 respectively. This mill also purchased a sizable quantity of turnings at $12. Yard collections continue very poor and despite the lack of consumer interest, there are no dealer stocks pressing on the market at the moment. Loading of a cargo of 7000 tons for England is under way this week, but date of arrival of additional boats, which have been promised, is uncertain due to wartime conditions.

Youngstown

The scrap market lacks any feature here this week and prices are unchanged. Open-hearth activity has been dropping very sharply. Prices attained by the recent railroad lists were in line with published quotations.

Cleveland

Prices obtained by the railroads at their recent monthly sales appear to substantiate present printed quotations. Steel on the principal railroad lists here is understood to have commanded around $17.75 for Ohio consumption.

Buffalo

With no new sales reported, the market fell off 50c. this week and No. 1 heavy melting steel is nominally quoted at $16.50 to $17. Customary differentials prevail in No. 2 steel, drop forge flashings, No. 1 busheling and other allied grades. Present lower operating rates of the mills render immediate sales problematical.

St. Louis

The scrap iron market is lower as a result of better weather presaging increased shipments to this market, plus a good inventory situation by the mills. A district steel mill bought approximately 5000 tons of No. 2 heavy melting steel. Most declines are 25c. and 50c. a ton. Railroad lists: Baltimore & Ohio, 5900 tons; New York, Chicago & St. Louis, 690 tons; Chicago & Eastern Illinois, 375 tons, and St. Louis Southwestern, 220 tons.

Cincinnati

The local scrap market continues to weaken and with business confined to infrequent purchases of small amounts, dealers reduced their bids another 25c. a ton during the past week. Mill buying is virtually nil, although small amounts are still moving forward on old commitments. Foundry grades are showing a little activity, but not sufficient to support the market generally, nor to make dealers greatly interested in the competing for available material strongly.

Birmingham

The most severe weather experienced in the south for over 40 years has paralyzed scrap deliveries to yards and as a result stocks are bare with the market standing still. There have been no price changes from last week.

New York

The market is somewhat heavy here on the domestic side, but prices are unchanged. There have been some additional purchases of scrap made by the British and the Italians, but the tonnages are relatively small, and no spectacularly large purchases are expected in the future, particularly on the part of the British who have no desire to upset the domestic market. It is too early to discern any trend in Japanese buying since the abrogation of the 1911 trade treaty. No new buying has taken place since Jan. 26.

Boston

Prices on practically all kinds of scrap for domestic delivery are lower. Chemical borings are down all of $1 a ton, breakable cast 50c., and turnings, blast furnace material and bundled skeleton as much. The withdrawal of a Weirton consumer from the market dropped the price from $10.25 a ton on cars for skeleton to $9.75, with no takers. For Pennsylvania consumption blast furnace material is now $5 flat, but for New England consumption $6.

Detroit

It might almost be said that prices quoted for the Detroit area currently are nominal because activity is virtually nonexistent. However, bids on monthly scrap lists, summarized, indicate that the quoted level is still being held without any marked concessions to the pessimistic feeling which underlies the market.

Toronto

Iron and steel scrap markets showed little change during the week. While prices are firm, with some dealers looking for advances, no changes were made in the week. Some of the larger collectors have withdrawn from the market and new offerings to dealers are very light. Steel mills continue to take all the heavy melting steel offered with good shipments to the Hamilton area. Local foundries are showing little interest in cast scrap, holding fairly good reserve of supplies for current needs. In the Orillia area foundries are heavily stocked with scrap and large Port Hope consumers also are well supplied.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.50 to	$18.00
Railroad heavy melting	18.50 to	19.00
No. 2 heavy melting...	16.00 to	16.50
Railroad scrap rails....	18.50 to	19.00
Rails 3 ft. and under...	21.50 to	22.00
Comp. sheet steel	17.50 to	18.00
Hand bundled sheets..	16.50 to	17.00
Heavy steel axle turn.	16.00 to	16.50
Machine shop turnings	11.50 to	12.00
Short shov. turnings..	13.50 to	14.00
Mixed bor. & turn.....	10.00 to	10.50
Cast iron borings	10.00 to	10.50
Cast iron carwheels ..	18.50 to	19.00
Heavy breakable cast.	15.00 to	15.50
No. 1 cupola cast	18.50 to	19.00
RR. knuckles & coup..	21.00 to	21.50
Rail coil springs	21.50 to	22.00
Rail leaf springs	21.50 to	22.00
Rolled steel wheels ...	21.50 to	22.00
Low phos. billet crops.	22.50 to	23.00
Low phos. punchings..	21.00 to	21.50
Low phos. heavy plate.	20.00 to	20.50
Railroad malleable	21.00 to	21.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.00 to	$18.00
No. 2 hvy. mltng. steel.	16.00 to	16.50
Hydraulic bund., new.	17.50 to	18.00
Hydraulic bund., old..	14.00 to	14.50
Steel rails for rolling..	21.50 to	22.00
Cast iron carwheels...	20.00 to	20.50
Hvy. breakable cast...	....	18.00
No. 1 cupola cast	20.00 to	20.50
Mixed yard (f'd'y) scrap	17.00 to	17.50
Stove plate (steel wks.)	....	15.00
Railroad malleable	....	22.00
Machine shop turn....	....	12.00
No. 1 blast furnace...	10.00 to	10.50
Cast borings	11.00 to	11.50
Heavy axle turnings...	15.00 to	15.50
No. 1 low phos. hvy...	21.00 to	21.50
Couplers & knuckles ..	21.00 to	21.50
Rolled steel wheels	21.50 to	22.00
Steel axles	....	22.50
Shafting	23.00 to	23.50
Spec. iron & steel pipe		17.50
Cast borings (chem.)..	14.00 to	14.50

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton	
Hvy. mltng. steel	$15.75 to	$16.25
Auto. hvy. mltng. steel alloy free	14.75 to	15.25
No. 2 auto steel	11.75 to	12.25
Shoveling steel	15.75 to	16.25
Factory bundles	15.00 to	15.50
Dealers' bundles	13.50 to	14.00
No. 1 busheling	14.50 to	15.00
No. 2 busheling, old...	5.75 to	6.25
Rolled carwheels	18.25 to	18.75
Railroad tires, cut	18.75 to	19.25
Railroad leaf springs..	18.25 to	18.75
Steel coup. & knuckles.	18.25 to	18.75
Axle turnings	14.75 to	15.25
Coil springs	19.25 to	19.75
Axle turn. (elec.)	16.75 to	17.25
Low phos. punchings..	19.25 to	19.75
Low phos. plates 12 in. and under	18.75 to	19.25
Cast iron borings	8.25 to	8.75
Short shov. turn.....	9.75 to	10.25
Machine shop turn....	8.25 to	8.75
Rerolling rails	18.75 to	19.25
Steel rails under 3 ft...	18.75 to	19.25
Steel rails under 2 ft...	19.25 to	19.75
Angle bars, steel	17.75 to	18.25
Cast iron carwheels ..	16.25 to	16.75
Railroad malleable	18.25 to	18.75
Agric. malleable	14.25 to	14.75
	Per Net Ton	
Iron car axles	21.50 to	22.00
Steel car axles	20.25 to	20.75
Locomotive tires	14.25 to	14.75
Pipes and flues	10.75 to	11.25
No. 1 machinery cast..	13.50 to	14.00
Clean auto. cast	13.75 to	14.25
No. 1 railroad cast....	13.00 to	13.50
No. 1 agric. cast	11.25 to	11.75
Stove plate	8.75 to	9.25
Grate bars	9.25 to	9.75
Brake shoes	10.75 to	11.25

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.50 to	$18.00
No. 2 hvy. mltng. steel.	16.50 to	17.00
Low phos. plate	20.50 to	21.00
No. 1 busheling	16.75 to	17.25
Hydraulic bundles	17.00 to	17.50
Machine shop turn....	11.00 to	11.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.00 to	$17.50
No. 2 hvy. mltng. steel.	16.00 to	16.50
Comp. sheet steel	16.50 to	17.00
Light bund. stampings	13.50 to	14.00
Drop forge flashings..	15.00 to	15.50
Machine shop turn....	9.50 to	10.00
Short shov. turn.	10.50 to	11.00
No. 1 busheling	15.75 to	16.25
Steel axle turnings....	15.00 to	15.50
Low phos. billet and bloom crops	22.50 to	23.00
Cast iron borings	10.50 to	11.00
Mixed bor. & turn.....	10.50 to	11.00
No. 2 busheling	10.50 to	11.00
No. 1 cupola cast.	18.50 to	19.00
Railroad grate bars....	14.00 to	14.50
Stove plate	14.00 to	14.50
Rails under 3 ft.	22.00 to	22.50
Rails for rolling	21.00 to	21.50
Railroad malleable	21.00 to	21.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$16.50 to	$17.00
No. 2 hvy. mltng. steel.	14.50 to	15.00
Scrap rails	17.00 to	17.50
New hvy. b'ndled sheets	14.50 to	15.00
Old hydraul. bundles..	13.00 to	13.50
Drop forge flashings...	14.50 to	15.00
No. 1 busheling	14.50 to	15.00
Machine shop turn....	10.00 to	10.50
Shov. turnings	12.50 to	13.00
Mixed bor. & turn.....	10.50 to	11.00
Cast iron borings	10.50 to	11.00
Knuckles & couplers..	21.00 to	22.00
Coil & leaf springs.....	21.00 to	22.00
Rolled steel wheels ...	21.00 to	22.00
No. 1 machinery cast..	17.50 to	18.00
No. 1 cupola cast.....	16.50 to	17.00
Stove plate	14.50 to	15.00
Steel rails under 3 ft...	21.50 to	22.00
Cast iron carwheels...	17.50 to	18.00
Railroad malleable ...	19.00 to	19.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$15.00 to	$15.50
No. 1 hvy. melting....	14.50 to	15.00
No. 2 hvy. melting.....	13.75 to	14.25
No. 1 locomotive tires.	15.75 to	16.25
Misc. stand. sec. rails.	15.50 to	16.00
Railroad springs	17.00 to	17.50
Bundled sheets	10.00 to	10.50
No. 1 busheling	13.50 to	14.50
Cast bor. & turn.....	6.00 to	6.50
Machine shop turn.....	6.50 to	7.00
Heavy turnings	10.50 to	11.00
Rails for rolling	17.50 to	18.00
Steel car axles	18.00 to	18.50
No. 1 RR wrought....	10.25 to	10.75
No. 2 RR. wrought....	14.00 to	14.50
Steel rails under 3 ft..	18.50 to	19.00
Steel angle bars	15.50 to	16.00
Cast iron carwheels...	17.00 to	17.50
No. 1 machinery cast..	17.75 to	18.25
Railroad malleable	16.25 to	16.75
Breakable cast	14.00 to	14.50
Stove plate	10.50 to	11.00
Grate bars	10.00 to	10.50
Brake shoes	10.50 to	11.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$13.25 to	$13.75
No. 2 hvy. mltng. steel.	11.25 to	11.75
Scrap rails for mltng..	17.25 to	17.75
Loose sheet clippings.	8.75 to	9.25
Hydrau. b'ndled sheets	12.75 to	13.25
Cast iron borings	4.25 to	4.75
Machine shop turn....	5.25 to	5.75
No. 1 busheling	9.75 to	10.25
No. 2 busheling	3.25 to	3.75
Rails for rolling	18.75 to	19.25
No. 1 locomotive tires.	14.75 to	15.25
Short rails	20.25 to	20.75
Cast iron carwheels...	15.25 to	16.75
No. 1 machinery cast..	16.75 to	17.25
No. 1 railroad cast....	14.75 to	15.25
Burnt cast	8.25 to	8.75
Stove plate	8.25 to	8.75
Agricul. malleable	13.25 to	13.75
Railroad malleable	16.25 to	16.75
Mixed hvy. cast.....	14.25 to	14.75

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	$16.00
No. 2 hvy. melting steel	15.00
No. 1 busheling	13.00
Scrap steel rails	15.00
Steel rails under 3 ft...	16.00
Rails for rolling	16.50
Long turnings	5.00
Cast iron borings	7.50
Stove plate	10.00
Steel axles	20.00
No. 1 RR wrought.....	14.00
No. 1 cast	15.00
No. 2 cast	11.00
Cast iron carwheels	13.00
Steel car wheels	16.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$13.00 to	$13.50
No. 2 hvy. mltng. steel.	12.00 to	12.50
Borings and turnings..	7.00 to	7.50
Long turnings	6.50 to	7.00
Short shov. turnings..	8.50 to	9.00
No. 1 machinery cast..	13.50 to	14.00
Automotive cast	15.00 to	15.50
Hvy. breakable cast...	10.50 to	11.00
Stove plate	9.00 to	9.50
Hydraul. comp. sheets.	13.75 to	14.25
New factory bushel....	12.50 to	13.00
Sheet clippings	8.75 to	9.75
Flashings	12.00 to	12.50
Low phos. plate scrap.	13.75 to	14.26

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$13.50 to	$14.00
No. 2 hvy. mltng. steel.	12.00 to	12.50
Hvy. breakable cast...	....	14.00
No. 1 machinery cast.	16.00 to	16.50
No. 2 cast	12.50 to	13.00
Stove plate	10.50 to	11.00
Steel car axles	19.00 to	20.00
Shafting	19.00 to	20.00
No. 1 RR. wrought....	14.00 to	15.00
No. 1 wrought long....	12.50 to	13.00
Spec. iron & steel pipe	13.50 to	14.00
Rails for rolling	19.00 to	20.00
Clean steel turnings*.	7.50 to	8.00
Cast borings*	8.00 to	9.00
No. 1 blast furnace....	8.00 to	9.00
Cast borings (chem.)..		Nominal
Unprepared yard scrap	7.50 to	8.00
Light iron	5.00 to	5.50

Per gross ton, delivererd local foundries:

No. 1 machin. cast....	$17.50 to	$19.25
No. 2 cast	16.50 to	17.00

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton

Breakable cast		$12.65
Machine shop turn.		6.65
Mixed bor. & turn....	$5.00 to	6.00
Bun. skeleton long....	9.75 to	10.00
Shafting	18.25 to	18.50
Stove plate	9.75 to	10.00
Cast bor. chemical ...	8.50 to	8.75

Per gross ton delivered consumers' yards:

Textile cast .....$17.00 to		$19.00
No. 1 machine cast....	17.00 to	19.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel.	$13.00 to	$13.50
No. 2 steel	12.00 to	12.50

PACIFIC COAST

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.		$16.00
No. 2 hvy. mltng. steel.		15.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel.....	$11.50	$11.00
No. 1 hvy. mltng. steel.	11.00	10.50
No. 2 hvy. mltng. steel.	9.75	9.25
Mixed dealers steel...	8.75	8.25
Drop forge flashings...	9.75	9.25
New loose clippings...	8.75	8.25
Busheling	5.50	5.00
Scrap pipe	7.75	7.25
Steel turnings	6.50	6.00
Cast borings	6.00	5.50
Machinery cast	17.00 to	16.50
Dealers' cast	16.00 to	15.50
Stove plate	12.00 to	11.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel.	$14.00 to	$14.50
No. 2 hvy. mltng. steel.	12.00 to	12.50
No. 2 cast	12.50 to	13.00
Stove plate	10.50	....

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.		$15.00
No. 2 hvy. mltng. steel.		14.00
Rails (scrap)	$15.00 to	15.50
Stove plate	8.65 to	8.75

Philadelphia, delivered alongside boats, Port Richmond.

No. 1 hvy. mltng. steel.....	Nominal
No. 2 hvy. mltng. steel.....	Nominal

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago or Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.45c.
Galveston	2.25c.

9/32 in. to 47/64 in. $3 a net ton higher. Quantity extras apply.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.15c.
Detroit, delivered	2.25c.
Duluth	2.25c.
Philadelphia, delivered	2.47c.
New York	2.49c.
On cars dock Gulf ports	2.50c.
On cars dock Pacific ports	2.75c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15c.
On cars dock Tex. Gulf ports	2.50c.
On cars dock Pacific ports	2.75c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	2.15c.
Detroit, delivered	2.25c.
On cars dock Tex. Gulf ports	2.50c.
On cars dock Pacific ports	2.50c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	2.15c.
Detroit, delivered	2.25c.
On cars dock Tex. Gulf ports	2.50c.
On cars dock Pacific ports	2.50c.

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.75c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary	2.65c.
Detroit	2.70c.

* In quantities of 20,000 to 39,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.
Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P'tg	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.10c.
Detroit, delivered	2.20c.
Philadelphia, delivered	2.27c.
Granite City	2.20c.
On cars dock Pacific ports	2.60c.
Wrought iron, Pittsburgh	4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.05c.
Detroit, delivered	3.15c.
Granite City	3.15c.
Philadelphia, delivered	3.37c.
On cars dock Pacific ports	3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron, Pittsburgh	6.10c.

Electrical Sheets
(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.80c.
F.o.b. cars dock Pacific ports	4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

Tin Plate

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary	$5.00
Standard cokes, Granite City	5.10

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	$4.40
Pittsburgh or Gary	4.30

Roofing Terne Plate
(F.o.b. Pittsburgh per Package, 112 sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

Black Plate, 29 gage and lighter

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c.

HOT ROLLED STRIP

(Widths up to 12 in.)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.10c.
Detroit, delivered	2.20c.
On cars dock Pacific ports	2.70c.

Cooperage Stock

Pittsburgh & Chicago	2.20c.

COLD ROLLED STRIP*

	Base per Lb
Pittsburgh, Youngstown or Cleveland	2.80c.
Chicago	2.90c.
Detroit, delivered	2.90c.
Worcester	3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	2.95c.
Detroit, delivered	3.05c.
Worcester	3.35c.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.80c.	3.00c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

	Base per 100 Lb.
Annealed fence wire	$3.05
Galvanized fence wire	3.30
Twisted barbless wire	3.40
Woven wire fence, 15½ gage and heavier base col.	67
Fence posts (carloads), base col.	69
Single loop bale ties, base col.	56
Stand. 2 pt., 12.5 gage barbed cattle wire, per 80 rod spool	$2.70
Stand. 2 pt., 12.5 gage barbed hog wire, per 80 rod spool	$2.88

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel			*Wrought Iron*		
In.	Black	Galv.	In.	Black	Galv.
⅛	56	36	¼ & ⅜	+9	+30
¼ to ⅜	.59	43½	½	24	6½
½	....63½	54	¾	30	13
¾	....66½	58½	1 & 1¼	.34	19
1 to 3	..68½	60½	1½	38	21½
			2	....37½	21

Lap Weld

2	61	52½	2	....30½	15
2½ & 3	..64	55½	2½ to 3½	34½	17½
3½ to 6.66		57½	4	....33½	21
7 & 8.65		55½	4½ to 8.32½		20
9 & 10.64½		55	9 to 12	..28½	15
11 & 12.63½		54			

Butt weld, extra strong, plain ends

⅛	....54½	41½	¼ & ⅜	+10	+43
½ to ⅜	.56½	45½	½	25	9
½	....61½	53½	¾	31	15
¾	....65½	57½	1 to 2	..38	22½
1 to 3	..67	60			

Lap weld, extra strong, plain ends

2	59	51½	2	....33½	18½
2½ & 3	..63	55½	2½ to 4.39½		25½
3½ to 6.66½		59	4½ to 6.37½		24
7 & 8.65½		56	7 & 8	..38½	24½
9 & 10.64½		55	9 to 12	..32	20½
11 & 12.63½		54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d.	13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d.	13 B.W.G.	10.67	9.26	....
1½ in. o.d.	13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d.	13 B.W.G.	13.42	11.64	11.06
2 in. o.d.	13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d.	13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d.	12 B.W.G.	18.45	16.01	15.16
2½ in. o.d.	12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d.	12 B.W.G.	21.42	18.59	17.54
3 in. o.d.	12 B.W.G.	22.48	19.50	18.35
3½ in. o.d.	11 B.W.G.	28.37	24.62	23.15
4 in. o.d.	10 B.W.G.	35.20	30.54	28.66
4½ in. o.d.	10 B.W.G.	43.04	37.35	35.22
5 in. o.d.	9 B.W.G.	54.01	46.87	44.25
6 in. o.d.	7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
*6-in. and larger, Birmingham	46.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.60
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45. Birmingham, and $53.80 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. and 6 in. and smaller	68½
Larger and longer up to 1 in.	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. to 1½ in. incl.	62
1⅝ in. and larger	60

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

	U.S.S.	S.A.E.
Semi-fin. hexagon nuts ½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. and larger	62	62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, with nuts loose	72½
Stove bolts in packages, with nuts attached, add 15% extra.	
Stove bolts in bulk	83½

On stove bolts freight is allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

(Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Alloy Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.70c.
Delivered, Detroit	2.80c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
200 (½% Nickel)	$0.35
2100 (1½% Nickel)	$0.75
2300 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
31 Nickel-chromium	0.70
3200 Nickel-chromium	1.85
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4340 Chr.-Ni.-Mo.	1.65
4345 Chro.-Ni.-Mo.	1.85
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
6100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots.

STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot stp.	17c.	17.50c.	24c.	35c.
Cold stp.	22c.	22.50c.	32c.	52c.

TOOL STEEL

High speed	57c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Ferromanganese, export	Nominal
Tin plate, per base box	32s. to 33s.
Steel bars, open hearth	12 £ 5s.*
Beams, open hearth	11 £ 2s. 6d.*
Channels, open hearth	11 £ 7s. 6d.*
Angles, open hearth	11 £ 2s. 6d.*
Black sheets, No. 24 gage	17 £ max.*; 17 £ min.**
Galvanized sheets, No. 24 gage	19 £ 10s. max.*; 19 £ 10s. min.**

* Empire markets only.
** Other than Empire markets.

CONTINENTAL

Per Gross Ton, Belgian Francs
f.o.b. Continental Ports

Bars, merchant	1500
Plates	1750
Joists	1475
Sheets, thin	1900

Above price are minimum base to which 100 francs should be added to cover war risk insurance, freight charges, etc.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, delivered Cincinnati	23.06
Northern, delivered, Cincinnati	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

Bessemer

F.o.b. Buffalo	$24.00
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Buffalo	$28.50

Gray Forge

Valley or Pittsburgh furnace	$22.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.34

Canadian Pig Iron

Per Gross Ton

Montreal

Foundry iron	$27.50 base
Malleable	28.00 base
Basic	27.50 base

Toronto

Foundry Iron	$25.50 base
Malleable	26.00 base
Basic	25.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $100.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$32.00
Domestic, 26 to 28%	39.50

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots, packed)	82.00*
75% (carload lots, bulk)	126.00*
75% (ton lots, packed)	142.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio
Per Gross Ton

10.00 to 10.50% $32.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50% $27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	11.00c.*
2% carbon	17.50c.*
1% carbon	18.50c.*
0.10% carbon	20.50c.*
0.06% carbon	21.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$98.00
2.50% carbon	103.00
2% carbon	108.00
1% carbon	118.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carload	$2.00
Ferrotungsten, 100 lbs. and less	2.25
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferracolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo. per lb. contained Mo. f.o.b. Langeloth, Pa.	80c.

* Spot prices are $5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores

Delivered Lower Lake Ports
Per Gross Ton

Old range, bessemer, 51.50%	$5.25
Old range, non-bessemer, 51.50%	5.10
Mesaba, bessemer, 51.50%	5.10
Mesaba, non-bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty
Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe	12c.
Swedish, low P, 68% Fe	12c.
Swedish, basic or foundry, 65% Fe	11c.
Caucasian, washed, 52% Mn	53c.
African, Indian, 44 to 48% Mn.	46c.
African, Indian, 49 to 51% Mn	48c.
Brazilian, 46 to 48% Mn	44c.
Cuban, del'd, duty free, 51% Mn	60c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$23.00 to $24.00
Tungsten, domestic, scheelite delivered	23.00 to 25.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$19.00
Rhodesian, 45%	22.00
Rhodesian, 48%	26.00 to $27.00
Turkish, 48-49%	27.00 to 28.00
Turkish, 45-46%	25.00 to 26.50
Turkish, 40-41%	22.00
Chrome concentrates c.i.f. Atlantic Seaboard, per gross ton: Turkish, 48-49%	$27.00 to $28.00

* All foreign ore prices are nominal

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$21.00
Domestic, f.o.b. Ohio River landing barges	21.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	$20.00 to 22.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	$25.00 to $25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$31.00
ditto, in bags, f.o.b., same mines	$32.60

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N. J.	5.10c.
No. 6, f.o.b. Bayonne, N. J.	3.57c.
No. 5 Bur. Stds., del'd Chicago	3.25c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate, del'd Cleve'd.	5.25c.
No. 4 industrial, del'd Cleve'd.	5.00c.
No. 5 industrial, del'd Cleve'd.	4.25c.
No. 6 industrial, del'd Cleve'd.	3.875c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$4.00 to $4.25
Foundry, f.o.b. Connellsville, Prompt	5.50 to 5.75
Foundry, by-product Chicago ovens	10.50
Foundry, by-product del'd New England	12.50
Foundry, by-product del'd Newark or Jersey City	11.38 to 11.90
Foundry, by-product Philadelphia	11.13
Foundry, by-product delivered Cleveland	11.05
Foundry, by-product delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by-product del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

REINFORCING STEEL

. . . Awards of 13,100 tons; 3925 tons in new projects

ATLANTIC STATES
AWARDS

1000 Tons, Wilmington, Del., hospital, unit No. 2, to Bethlehem Steel Co., Bethlehem, Pa., through Turner Construction Co., contractor.

300 Tons, Norwalk, Conn., housing project, to Caulway Constr. Co.

300 Tons, New York, building in Bronx, to Igoe Brothers, Newark, N. J.

300 Tons, Fogelsville, Pa., Lehigh Portland Cement Co. bins, to Bethlehem Steel Co., through James Stewart Co., contractor.

CENTRAL STATES

275 Tons, Dayton, Ohio, test chamber and wind tunnel at Wright Field, to Carnegie-Illinois Steel Corp., Pittsburgh, through National Concrete Fireproofing Co., Cleveland.

225 Tons, Licking County, Ohio, State highway project No. 274, to Pollak Steel Co., Cincinnati, through O. W. Merrill; Purdy Construction Co., contractor.

175 Tons, Champaign, Ill., power house, University of Illinois, to Joseph T. Ryerson & Son, Inc., Chicago.

150 Tons, Waterloo, Iowa, building for Rath Packing Co., to Sheffield Steel Corp., Kansas City.

118 Tons, Evanston, Ill., Patten gymnasium, Northwestern University, to Ceco Steel Products Co., Chicago, through R. C. Wieboldt Co., contractor.

110 Tons, Cincinnati, Hudepohl Brewing Co. plant, to Republic Steel Corp., Cleveland, through Truscon Steel Co.; J. & F. Harig Co., contractor.

WESTERN STATES

3550 Tons, Odair, Wash., Grand Coulee Dam (Invitation B-3808-88-A), to Bethlehem Steel Co., San Francisco.

2200 Tons, Pearl Harbor, T. H., two graving docks (Specification 9100), to Bethlehem Steel Co., through Pacific Bridge Co., San Francisco and Hawaiian Dredging Co., Honolulu, contractors.

1400 Tons, New Orleans, Lafitte Avenue housing project, to Orleans Building & Material Co., New Orleans, through R. P. Farnsworth, general contractor, New Orleans.

1300 Tons, New Orleans, Iberville housing project, to Connors Steel Co., Birmingham, through J. A. Jones Construction Co., Charlotte, N. C., general contractor.

1100 Tons, San Francisco, Potrero housing project, to Bethlehem Steel Co. San Francisco, through Meyer Construction Co., San Francisco, contractor.

305 Tons, Crescent City, Cal., Smith River bridge, to Bethlehem Steel Co., San Francisco, through Joseph Shaw, Oakland, Cal., contractor.

125 Tons, Caddoa, Colo., relocation of Santa Fe railroad, to Colorado Fuel & Iron Corp., Denver, through Western Contracting Co., Sioux City, Iowa, contractor.

125 Tons, Clyde, Cal., Central Valley project (Invitation 49085-A), to Columbia Steel Co., San Francisco.

PENDING REINFORCING BAR PROJECTS
ATLANTIC STATES

1365 Tons, Brooklyn, quartermaster supply, invitation QMSO-626-40-227; bids Feb. 6.

500 Tons, Hartford, Conn., housing project.

175 Tons, Peabody-Danvers, Mass., State road and bridge.

CENTRAL STATES

255 Tons, Chicago, subway approach section S-8-A; bids Feb. 8.

250 Tons, Hammond, Ind., pumping stations, contracts Nos. 10 and 11.

110 Tons, Cleveland, joists for St. Johns' Nurse's home; bids in.

Unstated tonnage, Akron, Ohio, Elizabeth Park housing project.

WESTERN STATES

850 Tons, Earp, Cal., Parker power plant (Invitation 44452-A); bids Feb. 12.

242 Tons, Tigard, Ore., grade separation and Fanno Creek bridge; bids Feb. 16.

165 Tons, Oahu, T. H., Naval ammunition depot (Specification 9397); Fred J. Early, Jr., San Francisco, contractor.

CAST IRON PIPE

Creede (Mineral County), Colo., will take bids soon for pipe lines for water system, and other waterworks installation. Cost close to $30,000.

Board of Water Commissioners, Macon, Ga., plans about 25,000 lin. ft. of 6-in., and 5000 lin. ft. of 4-in., for extension in system to point near Holton, about five miles, for water supply for new steam-electric generating station of Georgia Power Co., Atlanta, Ga., now in course of construction. Cost about $45,000.

Florida Keys Aqueduct Commission, Key West, Fla., plans pipe line from mainland to point near city for water supply. Cost close to $100,000.

Yadkinville, N. C., plans pipe lines for water system and other waterworks installation. Cost about $45,000. Financing has been arranged through Federal aid.

Delaware Township Committee, near Lansing, Kan., James Kern, trustee, care of R. M. LaFollette, Finance Building, Kansas City, Mo., consulting engineer, plans pipe lines for water system in district, including main line for connection with source of supply near Leavenworth, Kan. Estimates of cost are being made. Financing will be arranged through Federal aid.

Vancouver, Wash., plans about 35,000 lin. ft. of 4, 6 and 8-in., for extensions in water system to Minnehaha district. Financing is being arranged through Federal aid.

Alice, Tex., plans pipe lines for water system and other waterworks installation. Bond issue of $40,000 has been arranged for this and sewage system. Peurifoy & Patterson, Kingsville, Tex., are engineers.

McCamey, Tex., plans pipe lines for water system and other waterworks installation. Special election has been called on Feb. 17 to approve bonds for $50,000 for this and sewage system. Freese & Nichols, Capps Building, Fort Worth, Tex., are consulting engineers.

Sanford, N. C., plans pipe lines for water system and other waterworks installation. Fund of $68,800 is being arranged for this and sewage system.

Hickam Field, T. H., roads and utilities project involved 250 tons of 4, 6, and 8-in. pipe awarded to United States Pipe & Foundry Co., San Francisco, by J. E. Haddock, Pasadena, Cal., contractor.

Hawthorne, Cal., has awarded 250 tons of pipe to United States Pipe & Foundry Co., San Francisco.

Inglewood, Cal., has awarded 490 tons of 6 and 8-in. pipe, class 250, to National Cast Iron Pipe Co., Los Angeles.

Seattle has awarded 110 tons of 16-in. pipe to American Cast Iron Pipe Co.

Central Board of Purchases of Milwaukee (Wis.) County closes bids Feb. 15, for water pipe, special castings, valves, etc. Bids are on approximately 1000 tons of cast iron water pipe; 75 tons, more or less, special castings; 18 pieces reduced special castings; 575 valve boxes and 775 valve box parts; 313 gate and tapping valves; 175 fire hydrants and 80 fire hydrant parts; 30 tapping sleeves and four clamps for tapping sleeves.

Augusta, Me., has placed a tonnage of pipe with R. D. Wood & Co.

Procurement Department has placed a tonnage of 8-in. pipe for Gloucester, Mass., with Warren Foundry & Pipe Corp.

Worcester, Mass., is in the market for 20,000 ft. of 6 to 30-in. pipe; bids close next week.

FINANCIAL NOTES

Westinghouse Air Brake Co., Wilmerding, Pa., reports net earnings for 1939 of $1,765,629, equivalent to 87c. a share, compared with $993,816 or 32c. a share in 1938. Earnings for the fourth quarter of 1939 totaled $1,275,439 or 39c. a share.

Harbison Walker Refractories Co., Pittsburgh, in a preliminary report, shows net profit of $1,869,000 for 1939, equal to $1.24 a share of common stock, compared with $736,434 or 41c. a share for 1938.

. . . PIPE LINES . . .

Michigan Consolidated Gas Co., 415 Clifford Street, Detroit, is arranging fund of about $3,000,000 for expansion and improvements in properties in city area during 1940, a considerable part of appropriation to be expended for pipe line installations. About 80 miles of new mains will be installed, including a 22-in. high-pressure steel pipe line in East Detroit district, extending from Station H at Fort Street and Green Avenue, to Station B at Wight Street and Meldrum Avenue. In addition to sum noted, approximately $500,000 will be used for extensions and betterments in pipe lines and other properties in districts outside of city limits.

Sinclair-Prairie Pipe Line Co., Gulf Building, Houston, Tex., affiliated with Sinclair-Prairie Oil Co., same address, has awarded contract to O. C. Whitaker Construction Co., Waggoner Building, Fort Worth, Tex., for construction of new 8-in. welded steel pipe line from K-M-A oil field district, Wichita County, Tex., to Hensley, Jack County, Tex., about 66 miles, for crude oil transmission, forming loop with present 6-in. pipe line between same two points. Booster pumping stations will be installed.

San Bernardino National Forest District, San Bernardino, Cal., William V. Jones, supervisor, plans installation of pressure pipe line system in San Bernardino mountain district for water supply for fire prevention. A Federal appropriation of $260,000 is planned at present session of Congress. Pumping stations and other facilities will be installed.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 23 for steel pipe and steel tubing for Portsmouth, N. H., and Mare Island, Cal., navy yards (Schedule 685).

Empire Producing Co., Wellsville, N. Y., plans pipe lines in connection with development of properties in Oriskany natural gas field districts in parts of Allegany and Steuben Counties, N. Y. A number of new wells will be drilled. Cost reported close to $100,000.

Cle Elum, Wash., closes bids Feb. 12 for 32,600 lin. ft. of 16-in., 10-gage steel pipe with Dresser couplings for main water supply line; also alternate bids on same quantity of 14-in., 10-gage steel pipe; asbestos-cement pipe of both sizes noted, and cast iron pipe, similarly both sizes. And for about 20,750 lin. ft. of distribution mains, including 2460 ft. of 10-in., 3710 ft. of 8-in., 11,270 ft. of 6-in., and 3310 ft. of 4-in., all cast iron; 2500 ft. of ¾-in. and 600 ft. of 1-in. galvanized iron pipe. Also for 16,330 lb. of cast iron fittings, valves, valve boxes, etc. Financing has been arranged through Federal aid. Parker & Hill, Smith Tower Building, Seattle, are consulting engineers.

United States Engineer Office, Missouri River Division, Davidson Building, Kansas City, Mo., asks bids until Feb. 14 for 1,195,000 lb. of steel plate tunnel lining; also for shim plates, saddles, rod spiders, field rivets, bolts, etc., all for Fort Peck dam tunnel No. 1, Fort Peck, Mont. (Circular 3).

Penn-York Oil & Gas Corp., Masonic Temple Building, Olean, N. Y., plans pipe lines in connection with development of gas properties in natural gas field area in Potter County. Three new wells will be drilled on 900-acre tract of land. Cost close to $75,000.

Long Beach, Cal., has taken bids for furnishing 6600 ft. of 12-in. automatic electric welded steel pipe.

NLRB Hearing on Greer Steel

CLEVELAND—A hearing is scheduled to begin Feb. 14 at New Philadelphia, Ohio, upon a National Labor Relations Board complaint against the Greer Steel Co., charging discriminatory discharge of seven men for union activity at its Dover, Ohio, plant, according to Oscar S. Smith, regional board director.

THIS WEEK'S MACHINE . . . TOOL ACTIVITIES . . .

. . . Domestic orders have slackened in most centers, but volume of inquiries has increased . . . Several big tooling programs in sight in Detroit . . . Commitments from foreign buyers slowed up because of long deliveries quoted . . . Aircraft engine builders seek priorities on deliveries.

Lathe Demand Falls; Foreign Orders Lower

CINCINNATI—A downward fluctuation in machinery demand in this area, particularly for lathes, during the past week, brought the market level down several points from the general January average. Manufacturers, however, are not pessimistic over the decline since it will give them an opportunity for a breathing spell from the last quarter's hectic demand. Milling machines and grinders continue to be unusually active, while heavy machinery is still getting a fair amount of demand. Domestic ordering shows least tendency toward slackening off and delivery problems seem to be affecting somewhat the foreign demand. Manufacturers indicate that substantial amount of inquiry, especially from England and France continues to be present in the market, but buying agencies are emphasizing prompt delivery. As a result of this, the tendency to "shop around" in an effort to get early shipments is reported.

Production generally, however, continues to hold to previous high levels, but manufacturers generally refuse to make sharp expansion in producing schedules beyond present capacities. A substantial amount of business, however, is still being "farmed out" to less busy plants in other districts.

Market Quiet, Prospects Better at Cleveland

CLEVELAND—The local market for new machine tools remains quiet, but with prospects slightly better as a result of several fair-sized budgets reported approved recently. A forge company which bought a large spline grinder and gear shaping machines late last fall is inquiring for more equipment, including a boring mill. Small sales of speed lathes and grinders have been made to the aircraft parts industry which during the past year has been purchasing very heavily here, with one plant alone putting $1,300,000 into machines.

Press manufacturers and dealers encountered a pick-up about the middle of January. The rate of incoming business was better than the average of the fourth quarter of 1939. The outlook for the next 60 days is described as promising from both general industry and the automotive field. Great interest centers upon the auto industry's experiments with plastics for the production of large panels. These experiments are being conducted behind locked doors not only with resins but other materials.

Machine tool dealers report deliveries are improved on small equipment, but many large machines cannot be promised until late summer or the fall.

Tooling for New Light Cars Center of Detroit Interest

DETROIT—Progress of plans for a light Nash is reported with indications that the tooling program must be completed in time to permit introduction of the cars between the end of the regular model run and the start of 1941 production. This indicates possibly a June or July start on the new models. Packard pursues with renewed vigor its program for a light car, but the deadline is not so certain on this job which has not yet reached the tooling stage although some die work is reported active on it. Announcement of contract to Briggs Mfg. Co. to produce a sample aircraft engine for the government has resulted in a rush to Briggs' offices here in Detroit. It is learned that the engine still must go through some of the design and development stages before facts will be available on the proposed tooling.

Slight Slowing of Orders Noted at Chicago

CHICAGO—A slight slackening in new bookings has been noted at Chicago, but inquiries for a number of items are decidedly heavier. January machine tool business was only fair, according to machine tool interests here. No substantial uptrend, however, generally had been expected in view of sizable purchases toward the end of last year. The market has been little changed here in the past week except for a somewhat lighter demand for the heavier items. Boiler shops, warehouses, and structural erectors are fairly prominently involved in current demand, although sellers describe present buying as widely scattered. The outlook for machine tool business this month is reasonably encouraging, for considerable work is pending, involving both new inquiries and renewed interest on old ones.

Aircraft Buying Still Leads in the East

NEW YORK—Renewed buying on the part of the aircraft industry in recent weeks continues to occupy the spotlight, with government business, either directly or indirectly sponsored, a fair second. General industrial buying remains light. The present move in Washington to obtain priority of shipments to the aircraft engine builders is being watched closely here, since this is the market most affected. Details are reported elsewhere in this issue. Since September last the amount of buying of this character that has taken place has been comparable to the spending of the automotive industry in a year when a large number of mechanical changes are being made. There is every indication that once the question of deliveries has been straightened out, as much equipment again will be bought as has been ordered in the last five months.

As regards government-sponsored jobs, the bidding on small arms jobs for the Ordnance Department is responsible for considerable activity in the way of machine tool inquiries. Arsenal buying also continues at a high level.

Government Bids Announced

BOSTON — Low bidders for machine tools to be purchased by the Navy include the Cincinnati Milling Machine & Grinders Co., Cincinnati, four milling machines; Triplex Machine Tool Corp., New York, six milling machines and attachments; Lynd-Farquhar Co., Boston, four milling machines.

Low bidders for machine tools required by the War Department include Jones & Lamson Machine Co., Springfield, Vt., thread grinder; Henry Prentiss & Co., New York, universal turret lathe and two shapers; Sidney Machine Tool Co., Sidney, Ohio, five lathes.

Republic Earnings for Year Total $10,671,343

CLEVELAND — Republic Steel Corp. reports net income for 1939 of $10,671,343 after all charges and taxes. This compares with loss of $7,997,825 for 1938. Depreciation and depletion for 1939 amounted to $11,445,857, compared with $10,897,019 in the previous year. Federal income taxes for 1939 amounted to $2,450,000.

Net profits for 1939 were 4.6 per cent on the total investment. The rate of earnings on the common stock was $1.42 per share, with 5,833,065 shares outstanding. Commenting on the report, T. M. Girdler, chairman of the board, said:

"Republic's 1939 showing came largely as the result of stimulated domestic business. There has been some increase in export business, but very little of it is attributable to the war in Europe.

"Steel production during the last quarter was at an abnormally high rate, resulting in the purchase of steel in excess of current requirements. The drop in the first quarter of 1940 has been due in part to inventory adjustments. I see no reason, at this time, why the general average for the year should not be at a satisfactory rate."

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Continental Oil Co., 10 Rockefeller Plaza, New York, plans new gasoline refining plant in Westlake district, Lake Charles, La., comprising several large production units for high-test gasoline. Cost over $2,500,000 with equipment. Proposed to begin work in about 60 days. Operating offices are at Ponca City, Okla.

Dowty Equipment Corp., 25 Beaver Street, New York, aircraft equipment and accessories, has leased one-story industrial building at 41-28 Thirty-seventh Street, Long Island City, and will occupy for plant.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Feb. 12 for gages (Circular 427); until Feb. 13 for milling fixture (Circular 425).

Mohawk Paper Mills, Inc., Cohoes, N. Y., plans three-story and basement addition, 50 x 160 ft. Cost over $75,000 with equipment. Bids are being asked on general contract. C. F. Egan, Burdett Building, Troy, N. Y., is architect.

Protekote Corp., Long Island City, manufacturer of lacquers, paints, etc., has leased one-story industrial building at 9-01 Forty-third Avenue and will improve and occupy for plant.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Feb. 13 for 123,680 ft. of wire (Circular 271); until Feb. 21 for equipment, including motor-generator sets, rolling ladders, rectifiers, selector shelves, frames, relay racks, etc. (Circular 148).

Utica-Willowvale Bleaching Co., State Street, Utica, N. Y., plans new power house at mill at Willowvale, N. Y. Cost over $50,000 with equipment. Lockwood, Greene Engineers, Inc., 10 Rockefeller Plaza, New York, is consulting engineer.

Saratoga Cereal Products Co., Inc., Ballston Lake, N. Y., plans early rebuilding of portion of mill destroyed by fire several weeks ago. Cost close to $45,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 13 for motor-generator equipment (Schedule 660) for Brooklyn and Philadelphia Navy yards; parachute parts, including V-rings, snaps, frames, ferrules, links, etc. (Schedule 622) for Philadelphia Navy Yard.

Quartermaster Corps, Office of Constructing Quartermaster, Mitchel Field, Hempstead, L. I., asks bids until Feb. 14 for 18 metal doors (Circular 6201-28).

Tobacco Machine Supply Co., Inc., 230 Ferry Street, Newark, N. J., has leased portion of industrial building at 20 Main Street, Belleville, N. J., and will occupy for new branch plant. Equipment will be installed for employment of about 60 operatives.

Peter J. Schweitzer, Inc., 994 Newark Avenue, Elizabeth, N. J., manufacturer of manifold, carbon and other special paper stocks, has let general contract to Nicholas D'Elia, 2761 Hudson Boulevard, Jersey City, N. J., for one-story and basement addition, 90 x 150 ft. Cost close to $100,000 with equipment. William E. Lehman, 972 Broad Street, Newark, N. J., is architect.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Feb. 12 for 40,500 swivel loop assemblies (Circular 1100); until Feb. 13 for 30,300 safety arming wire clips, phosphor bronze (Circular 1098); until Feb. 15 for one thread-cleaning machine (Circular 1066), 32 pneumatic staking machines, each with capacity of 6000 lbs. at 80-lb. air pressure (Circular 1068); until Feb. 16 for five geared-head engine lathes, 12 x 30 in. super precision (Circular 1053).

Pennsylvania Salt Mfg. Co., Widener Building, Philadelphia, has acquired tract of about 50 acres at Cornwells Heights, near Philadelphia, fronting on Delaware River, as site for new plant. It will consist of several large one and multi-story units, with power house, pumping station, machine and other mechanical shops. Cost over $2,500,000 with equipment. New plant will replace present works at Delaware and Oregon Avenues, Philadelphia.

Post Office Department, Washington, will take bids soon on general contract for new multi-story automobile service, repair and garage building on Chestnut Street, 30th to 31st Streets, Philadelphia. Cost close to $1,000,000 with equipment. Supervising Architects, Public Buildings Administration, Federal Works Agency, Washington, is architect.

C. A. Hausser & Son, Belfield Avenue and Cosgrove Street, Philadelphia, manufacturers of surgical instruments, have let general contract to Harry H. Wehmeyer, 509 West Cumberland Street, for one-story addition. Cost close to $40,000 with equipment.

BUFFALO DISTRICT

Hewitt Rubber Corp., 240 Kensington Avenue, Buffalo, plans four-story and basement addition. Cost close to $85,000 with equipment. H. E. Plummer & Associates, Inc., 775 Main Street, is consulting engineer.

United States Engineer Office, Federal Building, Buffalo, asks bids until Feb. 12 for 12 forged steel drag davit eye-bolts, eight lower forged steel gate rods, and one cast steel gate rod turnbuckle (Circular 90); until Feb. 13 for five outboard motors (Circular 91).

Standard Brewing Co., 440 Lake Avenue, Rochester, N. Y., is having plans drawn by W. H. Barnes, 204 Thurston Road, architect, for one-story addition for storage and distribution. Bids will be asked soon on general contract. Cost close to $50,000 with equipment.

NEW ENGLAND

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Feb. 13 for one rolling and cleaning barrel machine (Circular 270); until Feb. 15 for one pedestal-type two-wheel grinder (Circular 263).

Robert Gair Co., Inc., 155 East 44th Street, New York, plans one-story addition to branch mill on Main Street, Portland, Conn. Cost over $50,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 13 for one motor-driven 36-in. wood-cutting band saw with equipment for Boston Navy Yard, and three similar band saws for Mare Island Navy Yard (Schedule 592); 23 steel stockless anchors (Schedule 633), steel barrels, with rods, eyes and links (Schedule 630), ring chains, shackles and anchor bails (Schedule 631) for Melville, R. I., and Sewall's Point yards; until Feb. 23 for chain hoists (Schedule 683) for Boston, Charleston and Puget Sound Navy yards.

Atlantic Gelatin Co., Inc., Hill Street, Woburn, Mass., has begun construction of new power house, 60 x 60 ft., and 45 ft. high, for which general contract recently was let to F. LeRoy Fox, Inc., 101 Milk Street, Boston. A reinforced concrete stack, 175 ft. high, will be built. Cost over $50,000 with equipment.

WASHINGTON DIST

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until Feb. 12 for three centrifugal pumps (Circular 482), two steam jet heaters, three circulating steam heaters, two temperature regulators (Circular 483).

Rustless Iron & Steel Corp., 3400 East Chase Street, Baltimore, is arranging immediate financing through sale of 40,000 shares of common stock to provide funds for mill expansion, including one-story addition for enlargement in melting department, installation of new 16-in. electric air furnace and auxiliary equipment; also for certain improvements in present plant. Cost about $600,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until Feb. 13 for 15,000 conduit pipe clamps, bridle rings, riveters' and cable splicers' umbrellas, battery charging clips, cartridge type resistors and other equipment (Schedule 3881); until Feb. 14 for one motor-driven single-cylinder woodworking surfacer (Schedule 3883); until Feb. 15 for 20,000 ft. of bare copper antenna wire (Schedule 3887).

Norfolk & Western Railway Co., Roanoke, Va., has let general contract to John P. Pettyjohn & Co., 212 Eighth Street, Lynchburg, Va., for six one-story storage and distribution buildings at Lamberts Point terminal property, Norfolk, Va., at $46,000 exclusive of equipment.

Contracting Officer, Office of Chief of Engineers, Munitions Building, Washington, asks bids until Feb. 16 for eight motorized road graders, gasoline engine-driven, tandem or front and rear drive, with alternate bid on nine such grader units (Circular 94).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 13 for five ball bearing drill presses and 10 motor-driven drill presses (Schedule 646), one horizontal, heavy-duty air compressor, complete with motor, starter, aftercooler and receiver (Schedule 645) for Sewall's Point, Va., yard; one motor-driven, portable, pipe and bolt-threading, cutting-off and reaming machine (Schedule 579), one tilting arbor type saw bench, complete with motor, controls, attachments and spare parts (Schedule 577), one motor-driven polishing lathe (Schedule 578); until Feb. 16 for one motor-driven turret lathe (Schedule 621), one motor-driven pipe-threading machine (Schedule 627), composition pipe fittings (Schedule 381) for Eastern and Western navy yards.

SOUTH ATLANTIC

Merrill-Stevens Dry Dock Co., 1270 N. W. Eleventh Street, Miami, Fla., has low bid from Paul H. Smith Construction Co., 3301 North Miami Avenue, for one-story shop and warehouse building, and three new slips at yard at N. W. Seventeenth Avenue and river front, at $69,900 and will make award soon. Cost close to $90,000 with equipment. R. A. Belsham, 2145 S. W. Eleventh Street, is engineer.

United States Engineer Office, Jacksonville, Fla., asks bids until Feb. 12 for two cast steel swing sheave housings, two cast steel swing sheaves, two steel plate swing sheave washers, two cast steel bracket and forged steel pin swing sheave trunnions, one cast steel double bearing pedestal (Circular 373); one cast steel suction side dredging pump head, 12 extra plate liners for suction side head, one dredging pump head, one cast steel dredging pump runner, one cast iron dredging pump stuffing box, two dredging pump running shafts and quantity of bolts (Circular 374).

SOUTH CENTRAL

Teal Chemical Co., 1305 Commerce Street, Tarrant City, Ala., has approved plans for one-story addition for production of calcium carbide and allied products, with installation to include an electric furnace unit and auxiliary equipment. Cost over $50,000 with machinery.

Frankfort Distilleries, Inc., Columbia Building, Louisville, plans one-story addition to branch distilling plant on Race Street, Baltimore, to be equipped as a mechanical-bottling unit. Cost over $45,000 with equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until Feb. 12 for stove bolts, lag screws, set screws, machine bolts, carriage bolts, wood screws, etc. (Circular 152).

Grand-Pop Bottling Co., 810 West Fifth Street, Cincinnati, plans new one and two-story mechanical-bottling, storage and distributing plant on Versailles Pike, near city limits of Lexington, Ky. Cost close to $50,000 with equipment. John T. Gillig, Lexington, is architect; Carl J. Kiefer Associates, Inc.,

Schmidt Building, Cincinnati, is consulting engineer.

United States Engineer Office, Second District, New Orleans, asks bids until Feb. 14 for 7,500,000 sq. ft. of galvanized welded wire fabric (Circular 301).

SOUTHWEST

Blanton Co., 318 South Second Street, St. Louis, food products, will take bids soon on superstructure for new plant on Wharff Street, consisting of group of six one and two-story structures. Cost about $400,000 with equipment. Award for foundations has been made to Hercules Construction Co., 8808 Ladue Road. W. J. Knight & Co., Wainwright Building, are architects and engineers.

Sealright Co., Inc., Fairfax and Rickel Roads, Kansas City, Kan., has let general contract to A. D. Todd, 2916 North 10th Street, for one-story addition, 80 x 155 ft. Cost over $50,000 with equipment. Charles E. Keyser, 609 Minnesota Avenue, is architect. Main offices are at Fulton, N. Y.

City Council, Webb City, Mo., plans new municipal diesel power plant. Estimates of cost and surveys will be made soon.

Pure Oil Co., 2906 Dawson Road, Tulsa, Okla., plans rebuilding of portion of machine shop recently destroyed by fire. Loss close to $40,000 with equipment.

Houston Radiator & Fender Co., Inc., 1020 McKee Street, Houston, Tex., has let general contract to Roy B. Callaway, 1836 Branard Street, for one-story addition, 55 x 100 ft. Cost about $40,000 with equipment.

Gulf Plains Corp., 222 Roseborough Street, San Antonio, Tex., Robert T. Wilson, president, recently organized, plans new gas recycling plant in Stratton oil field area, Neuces County, Tex. Cost over $85,000.

City Council, Austin, Tex., Guiton Morgan, city manager, plans extensions and improvements in municipal power plant. Cost over $75,000 with equipment.

WESTERN PA. DIST.

Corry-Jamestown Mfg. Co., West Main Street, Corry, Pa., plans one-story addition. Cost close to $50,000 with equipment.

United States Engineer Office, New Post Office Building, Pittsburgh, and Washington, asks bids until March 12 for gantry cranes for Mahoning dam, near Dauton, Pa., each crane to be equipped with double-drum hoist of 64 tons net lifting capacity; and one crane, in addition, to be equipped with a 50-kw. gasoline-electric generating unit, 10-ton capacity boom and suitable electric hoists (Circular 450).

Mallory Coal Co., Mallory, W. Va., plans rebuilding of main tipple at No. 1 and 3 mines, recently destroyed by fire. Loss over $125,000 with equipment.

OHIO AND INDIANA

Ohio Oil Co., Findlay, Ohio, plans two-story storage and distributing building, 100 x 125 ft., on Main Street, near First Street, Newark, Ohio, with one-story mechanical shop, service and garage building, 100 x 235 ft. Cost close to $175,000 with equipment.

Village Council, Oberlin, Ohio, plans extensions and improvements in municipal power plant, cost about $65,000. H. V. Zahn is city engineer.

Diamond Portland Cement Co., Middle Branch, Ohio, plans two-story addition, 75 x 115 ft., for storage and distribution. Cost about $40,000 with equipment.

Hydraulic Press Mfg. Co., Mount Gilead, Ohio, has let general contract to Austin Co., 16112 Euclid Avenue, Cleveland, for one-story addition, 50 x 130 ft. Cost about $45,000 with equipment.

Combined Properties, Inc., 918 East Court Street, Cincinnati, will take bids soon on general contract for one-story mechanical-bottling plant, 120 x 126 ft., at Chapel Street and Gilbert Avenue. Cost close to $40,000 with equipment. G. H. Godley, 307 East Fourth Street, is architect.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Feb. 12 for 15 complete sand blast unit cabinets, consisting of cabinet, blast unit, elevator-separator, dust collector, hose, piping, connections and motors (Circular 1003); until Feb. 13 for iron and steel wire (Circular 1015); one two-wheel hand truck for portable welding outfit, 41 cargo or freight-type two-wheel hand trucks, 66 platform trucks, four 4000-lb. capacity electric platform trucks, seven 3000-lb. capacity electric crane-type trucks, one similar truck of 6000 lbs. capacity, hydraulic-lift trucks, platform hand trucks and other type trucks (Circular 988), 43 arbor presses (Circular 1004); until Feb. 14 for large quantities of aircraft cable, lighting and power cable, and wire (Circular 1005); until Feb. 15 for one motor-driven, bench-type nibbling machine (Circular 1024).

Coca-Cola Bottling Co., 927 Pennsylvania Street, Evansville, Ind., has asked bids on general contract for one and two-story mechanical-bottling plant addition, 100 x 155 ft. Cost over $60,000 with equipment. Fowler & Legeman, 11 N. W. Fifth Street, are architects.

MICHIGAN DISTRICT

John Deere Plow Co., Moline, Ill., plans four-story addition to branch plant at Lansing, Mich. Cost over $85,000 with equipment.

Evans Products Co., 15310 Fullerton Street, Detroit, has secured option on property at Marshfield, Ore., for new plant to supplement present works at that place. Cost over $500,000 with equipment.

Consumers Power Co., Jackson, Mich., is arranging fund of $14,000,000 for expansion and improvements in power plants, transmission and distributing lines, power substations and other structures during 1940.

W. O. Barnes Co., Inc., 1297 Terminal Avenue, Detroit, has let general contract to F. H. Martin Construction Co., 955 East Jefferson Street, for one-story addition. Cost about $40,000 with equipment. Giffels & Vallet, Inc., and L. Rossetti, Marquette Building, are architects and engineers.

MIDDLE WEST

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., asks bids until Feb. 12 for 400 valves for nitrogen service (Circular 644); until Feb. 21 for 22 medium tractor cranes, full track-laying, diesel engine-powered; one full track-laying heavy tractor crane; and 16 medium tractors, full track-laying, 45-hp. diesel engine-powered (Circular 619).

W. C. Ritchie & Co., 8855 South Baltimore Avenue, Chicago, manufacturer of fiber cans and containers, will take bids soon on general contract for three-story and basement addition. Cost over $80,000 with equipment. Shaw, Naess & Murphy, 80 East Jackson Boulevard, are architects.

Wisconsin Power & Light Co., 122 West Washington Avenue, Madison, Wis., plans expansion and improvements in hydroelectric power plant at Prairie du Sac, Wis. Cost about $160,000. Application has been made for permission.

Frank Turner, 804 Commercial Street, Waterloo, Iowa, has superstructure under way for new two-story and basement Coca-Cola mechanical-bottling, storage and distributing plant, 130 x 130 ft., at Washington Street and Mullen Avenue, Waterloo, for which general contract recently was let to Sheffield Construction & Engineering Co., 35 East Wacker Drive, Chicago. Cost close to $90,000 with equipment.

Construction Service, Veterans' Administration, Washington, asks bids until Feb. 27 for coal-handling equipment for power house at institution at Knoxville, Iowa.

Gates Rubber Co., Inc., 999 South Broadway, Denver, Colo., has filed plans for two-story addition, 80 x 145 ft. Cost over $50,000 with equipment. Erection will be carried out by day labor.

United States Engineer Office, Fort Peck, Mont., asks bids until Feb. 15 for pipe carriages (Circular 129).

American Iron & Metal Co., 801 Walnut Street, Denver, Colo., has asked bids on general contract for one-story storage and distributing plant on Brighton Boulevard, 50 x 195 ft. Cost about $45,000 with equipment. T. H. Buell & Co., 730 Fourteenth Street, are architects.

PACIFIC COAST

Seattle Brewing & Malting Co., 3100 Airport Way, Seattle, will begin work soon on one and two-story additions, 70 x 165 ft., and 62 x 90 ft. General contract was let recently to A. W. Quist, Exchange Building. Cost over $75,000 with equipment. Joseph Wohleb, Olympia, Wash., is architect.

Commanding Officer, Ordnance Department, Ordnance Depot, Ogden, Utah, asks bids until Feb. 13 for topping off plates, steel (Circular 10).

Seaboard Lemon Association, North Hayes Avenue, Oxnard, Cal., has approved plans for three-story addition, 90 x 135 ft., to fruit-packing plant. Cost over $75,000 with mechanical-handling and other equipment. An air-conditioning system will be installed, for which separate bids will be asked soon. W. C. Jones, 731 Second Avenue, Upland, Cal., is construction engineer in charge. W. W. Ache, 301 North Citrus Avenue, Los Angeles, is architect.

Pacific Gas & Electric Co., 245 Market Street, San Francisco, has plans for new steam-electric generating plant at Oleum, Cal., in vicinity of properties of Union Oil Co., for service for oil refinery. Cost close to $250,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 13 for 4000 soft steel hand-hole gaskets (Schedule 586), one 12,500-gal. capacity tank car (Schedule 562) for Mare Island, Cal., Navy Yard; until Feb. 16 for one 12-in. vertical shaper (Schedule 600), one 16-in. rapid traversaw shaper, with plain table (Schedule 601), one open-side hydraulic shaper-planer (Schedule 599), all motor-driven, for Alameda, Cal., Naval Air Station; one heavy-duty revolving bake oven (Schedule 628); until Feb. 23 for spare parts for airplanes (Schedule 900-3077), spare parts for airplanes (Schedule 900-3094) for San Diego, Cal., Naval Air Station; until Feb. 16 for one squaring shear (Schedule 598), one semi-portable high-pressure air compressor (Schedule 618), both motor-driven; until Feb. 20 for four motor-driven generator sets, four controllers and spare parts (Schedule 659) for Puget Sound, Wash., Navy Yard.

Great Western Malting Co., Vancouver, Wash., plans new grain elevator with capacity of 500,000 bu. Cost about $200,000 with elevating, screening, conveying and other mechanical equipment.

FOREIGN

Post and Telegraph Department, Wellington, New Zealand, asks bids until March 1 for quantity of underground cable (Contract No. 98), quantity of switchgear (Contract No. 99); until March 5 for one 5-ton crane (Contract No. 1056), one 40-ton crane (Contract No. 1057), one traveling grab (Contract No. 1061), quantity of multicore cable (Contract No. 1046); until March 12 for switchgear and steel work (Contract No. 27) for Christchurch district; until March 19 for switchgear and steel work (Contract No. 55) for Hamilton district; switchgear and steel work (Contract No. 32) for Christchurch district; quantity of 11-kv. switchgear (Contract No. 44) for Palmerston North district; until April 2 for quantity of switchgear and steel work (Contract No. 35) for Palmerston North district.

Ministerio de Obras Publicas, Direccion de Obras Hidraulicas y Sanitarias, Caracas, Venezuela, asks bids until April 2 for one floating asphalt plant on steel barge, 145 ft. x 44 ft. x 7 ft. 6 in.; one asphalt mattress and sinking plant mounted on steel barge, 130 ft. x 45 ft. x 5 ft.; one diesel-powered steel tow-boat, 70 ft. long; one similar tow-boat, 40 ft. long; and 13 miscellaneous steel barges. Plans at office of Parsons, Klapp, Brinckerhoff & Douglas, 142 Maiden Lane, New York, consulting engineers.